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**Third Quarter (September) 2006  
Groundwater Monitoring Report  
for the  
Rose Township Demode Road Site  
913 Demode Road  
Holly, Michigan**

*Prepared For:*

Rose Township Settling Defendants  
800 Chrysler Drive  
Auburn Hills, MI 48326

*Prepared By:*

Earth Tech, Inc.  
36133 Schoolcraft  
Livonia, MI 48150

**December 8, 2006**



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Holly, Michigan 48442**

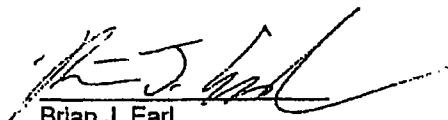
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## **1.0 INTRODUCTION**

This groundwater monitoring report documents field activities and analytical results from the September 2006 (Third Quarter) groundwater sampling activities conducted at the Rose Township Demode Road Site (Site), located at 913 Demode Road, Holly, Michigan (Figure 1). A total of 33 groundwater monitoring wells and two active extraction wells were purged and sampled between September 18 and 26, 2006, using either low-flow pumping methods or by use of natural artesian conditions. Groundwater level measurements were collected from 99 groundwater monitoring wells on September 22, 2006. This report summarizes the methods and procedures used during the monitoring event and the results of the September 2006 field activities.

### **1.1 SITE DESCRIPTION AND BACKGROUND**

The Site is comprised of approximately 110 acres and is located in the northwestern corner of Oakland County. Regional topography consists primarily of broad flat plains with numerous shallow depressions and valleys occupied by lakes, ponds, wetlands, and streams. These plains are traversed by a series of southwest to northeast trending ridges formed by glacial end moraines. The topography of Oakland County and all of southeastern Michigan is dominated by glacial features created during the retreat of the Saginaw lobe of the Laurentide ice sheet during the Wisconsin Glacial Stage (approximately 10,000 to 20,000 years ago). The regional ground surface elevation ranges from approximately 630 to 1,220 feet above mean sea level (ft. AMSL). The area receives on average 30 inches of precipitation per year. Average monthly temperatures range from 23 °F (January) to 72 °F (July).

The Site was used as an unlicensed landfill for industrial wastes from the mid 1960s until approximately 1971 when Rose Township brought a second law suit against the waste hauler and the land owner. The illegal disposal activities were conducted on approximately 12 acres of the upland portion of the Site. In 1979 the Michigan Department of Environmental Quality (MDEQ), formerly the Michigan Department of Natural Resources (MDNR), conducted a drum survey on the property and identified approximately 1,500 drums on Site. A large number of these drums were severely deteriorated and had apparently released their contents. Based on

this survey and the subsequent sampling of the identified drums, an interim remedial action was conducted by the MDEQ to remove the drums. By July 1980, more than 5,000 drums were identified and removed from the Site by the MDEQ.

Since 1980, the Site has been the subject of numerous investigations and remedial response activities, as summarized below:

- 1980 to 1982 – Initial Site investigation conducted by the MDEQ.
- 1982 – Site becomes part of the Federal Superfund program. A Remedial Investigation/Feasibility Study (RI/FS) is initiated.
- 1986 – The MDEQ conducts additional groundwater delineation activities.
- 1987 – Cleanup plan selected. Record of Decision (ROD) issued requiring Incineration of polychlorinated biphenyl (PCB) contaminated soil and extraction and treatment of contaminated groundwater with discharge to wetlands.
- 1989 - ROD Amendment #1 - Soil Flushing is added to the ROD as a soil remedy.
- 1992-1993 – Incineration of 50,000 cubic yards of PCB contaminated soil.
- 1995 – ROD Amendment #2 – Soil vapor extraction (SVE) chosen for remaining contaminated soils. Target cleanup levels (TCLs) for volatile organic compounds (VOCs) in soil were also amended.
- 1995 – 1996 – Both SVE and groundwater extraction/treatment systems designed and constructed.
- 1997 – Earth Tech is subcontracted for the operation, maintenance, and monitoring (OM&M) of the Site.
- 2002 – Dissolved vinyl chloride concentrations detected beyond the groundwater system capture zone.
- 2004 – Dissolved vinyl chloride concentrations detected at northeast boundary of the Site. Earth Tech begins off-Site delineation activities.
- 2005-2006 – Hydrologic Study conducted to determine the interaction between surface water and groundwater at the Site.

## **1.2 GEOLOGY/HYDROGEOLOGY**

The Site is located on a glacial end-moraine and represents a local topographic high which serves as a local recharge area for the shallow aquifer. Site topography ranges from approximately 950 to 1,100 ft. AMSL. The surface water runoff from the Site drains to wetland areas that border the Site on the northeast and west.

The regional geology consists of approximately 250 to 300 feet of glacial drift underlain by bedrock comprised of the Mississippian-aged Coldwater Shale and Marshall Formation (sandstone unit). The glacial drift is composed of complex stratifications of clay tills, outwash

deposits (sand and gravel), and ice contact deposits (silts and silty clays). Lacustrine deposits (silt and clay) are also common in the topographically lower lying flat areas and are gradational and interbedded with glacial outwash deposits.

The shallow Site geology consists of complex interbedded glacial deposits (silt to gravelly sands) underlain by clay till that appears to be laterally continuous across the Site and surrounding area. This till layer is considered the base of the aquifer of interest at the Site. In the northeastern and western portions of the Site (the topographically lower areas comprised of wetlands) these water bearing silts and sands are overlain by interbedded lacustrine clays. These interbedded lacustrine clays produce semi-confining conditions for the aquifer causing wells in the lower elevation portions of the Site (areas below approximately 990 ft. AMSL) to flow under natural artesian pressure.

The Site is within an area of complex hydrogeology. The soil below the Site is composed of interbedded clay, silt, sand and gravel. The percentage of each material composing the aquifer affects the direction and velocity of groundwater flow, resulting in changes in the direction and nature of the dissolved contaminant plume. Groundwater flow is generally from south to north across the southern two thirds of the Site, toward well DNR-7 (Figure 2). This portion of the Site, located on a topographic high, acts as a local groundwater recharge area. North of well DNR-7, on the northern third of the property, there is a marked decrease in ground surface and aquifer elevation. Just north of this area the aquifer becomes artesian due to the presence of the interbedded lacustrine clays and a corresponding drop in topography. The aquifer pinches and thins out toward the north, which corresponds to a change in groundwater flow direction to the east-northeast towards the wetlands that are present on the northeastern portion of the Site.

### **1.3 STATUS OF GROUNDWATER INVESTIGATIONS**

A dissolved VOC plume has been detected in the water bearing zone beneath the Site. Trichloroethene (TCE) and its degradation products, *cis*-1,2-dichloroethene (*cis*-1,2-DCE) and vinyl chloride (VC), are the most prevalent VOCs in groundwater beneath the Site. TCE is encountered mainly in wells on the south end of the Site near the existing building. VC has been observed in wells near the area of the on-Site building extending to, and possibly beyond,

the northeast property boundary. To monitor the groundwater plume at the Site, 35 monitoring wells are sampled quarterly with an additional 21 wells sampled on an annual basis.

The potential for off-Site groundwater contamination was considered based on the observed VC concentrations in groundwater at the Site property boundary, and the detection of low concentrations of VC in a residential supply well at 510 Demode Road. The residents of this home utilize bottled water for drinking, a treatment system has been installed for the home, and the well is monitored on a monthly basis. VC concentrations in samples from this well have ranged from 0.4 µg/L to 3.5 µg/L since 2003, with the most recent sample (September 2006) containing VC at 3.2 ug/L.

To investigate whether this VC originates at the Site, eight monitoring wells, including GW-22S, GW-22I, GW-22D, GW-23S, GW-23I, GW-23D, GW-24I, and GW-24D were installed off-Site on the opposite side of the wetlands east of the Site (Figure 1). These off-Site wells are sampled quarterly and to date have shown no detectable levels of dissolved VOCs.

To fill possible data gaps and further refine the understanding of the Site hydrogeology and VOC contaminant migration mechanisms, four additional off-Site monitoring wells, MW-25I, MW-25D, MW-26I and MW-26D were installed in April 2006 (Figure 1). With the exception of a low concentration of toluene in GW-26D (1.1 µg/L) in the sample from June 2006 only, VOCs have not been detected in these wells.

## **2.0 FIELD AND ANALYTICAL METHODS**

Groundwater gauging and sampling activities were performed at the Site between September 18 and 26, 2006. With the exception of the natural flowing artesian wells, the groundwater monitoring wells were purged and sampled using low-flow minimal draw-down techniques. The artesian wells were purged using the natural flow-pressures at the wellhead. The field practices and procedures used for the groundwater monitoring wells during the September 2006 quarterly groundwater monitoring event were consistent with those established during previous monitoring events. Eighteen of the 35 wells sampled this quarter were purged using a peristaltic pump and dedicated tubing. Four of the 35 wells were sampled using a bladder pump and dedicated tubing. Eleven wells were purged and sampled using natural artesian flow. Two active recovery wells were also sampled. A brief description of the groundwater gauging, sampling, and analyses are provided below.

### **2.1 GROUNDWATER ELEVATIONS**

On September 22, 2006, Earth Tech collected static groundwater level measurements from 99 monitoring wells located both on-Site and off-Site (Table 1 and Figure 2). The groundwater levels from the flowing artesian wells were measured using a sealed k-packer wellhead assembly with a pressure transducer capable of reading water levels to an accuracy of 0.01 feet. Prior to gauging the wells, the transducer was calibrated and any difference in vertical distance from the calibration point to the water surface was noted and recorded so that the readings could be corrected later, if necessary. The device was set on top of each well casing and the pressure head was allowed to stabilize before it was recorded in units of feet of water above the top of the well casing (ATOC). The water levels from the stainless steel monitoring wells (GW-1S, GW-2, GW-3S, GW-4S, and GW-6S) were measured using a separate k-packer assembly designed to seal their larger inside diameter.

The groundwater levels from the non-flowing wells were measured to within 0.01 feet, using an electronic water level indicator. The distance from the top of the well casing to the groundwater potentiometric surface in the well was measured and recorded as the static water level (SWL). The groundwater level elevations were calculated by subtracting the SWL from the TOC

elevation. The water level indicator was decontaminated prior to each use. The active extraction wells, PW-1, PW-3, PW-7, and PW-8, were not gauged as the water levels in these wells are not representative of static groundwater elevations. Groundwater levels from inactive extraction well PW-5 and active extraction wells, PW-4 and PW-6, were also not measured as these wells are under uncontrollable artesian conditions.

## **2.2 GROUNDWATER SAMPLING PROCEDURES**

Groundwater sampling was conducted between September 18 and 26, 2006. Details summarizing the sampling procedures for the low-flow pumping method and natural artesian flow methods are provided in the following sections.

### **2.2.1 LOW-FLOW SAMPLING METHODS**

A total of 22 groundwater monitoring wells were purged using low-flow methods, utilizing either a peristaltic pump (18 wells) or a bladder pump (4 wells), at flow rates ranging from 100 to 500 milliliters per minute. During the installation of the tubing for the peristaltic pump or the placement of the bladder pump, care was taken to minimize disturbance of the stagnant water column in the well. If a bladder pump was used to purge the well, the pump was installed in the well and left in place for at least one hour to equilibrate with the water column before purging commenced.

Field parameters, including pH, temperature, conductivity, dissolved oxygen, oxidation reduction potential (ORP), salinity, and turbidity, were collected and recorded throughout purging activities. With the exception of turbidity, field parameter readings were measured in-line using a sealed flow-through cell and multi-parameter analyzer. Turbidity readings were obtained using an extracted water sample and a separate optical turbidity meter. Groundwater purging continued until the pH, temperature, and conductivity parameters were observed within  $\pm 10$  percent of the average of three measurements taken five minutes apart. Once the groundwater quality parameters stabilized, the tubing was removed from the flow-through cell and the sample collected directly from the discharge line of the peristaltic or bladder pump. The discharge flow

rate was decreased, as necessary, to maintain laminar flow while filling the sample bottles. All purge water was disposed through the on-Site groundwater remediation treatment system.

### **2.2.2 NATURAL ARTESIAN FLOW SAMPLING METHODS**

A total of 11 monitoring wells were purged using natural artesian flow. The flowing artesian wells were sampled using a sealed k-packer wellhead assembly with a small diameter hose barb at the other end. A short section of hose attached this assembly to a flow diversion valve which controlled the amount of water flowing into the flow-through cell. The water flow into the cell was only reduced far enough not to damage the flow through cell. Field parameters were collected and recorded throughout purging activities, as described above for the low-flow sampling method. All purge water was disposed through the on-Site groundwater remediation treatment system.

### **2.2.3 ACTIVE GROUNDWATER EXTRACTION WELL SAMPLING METHODS**

Two active groundwater extraction wells were sampled during the September 2006 quarterly sampling event. These well samples were collected through sample collection ports built into the piping between the groundwater treatment system and each well. Field parameters, including pH, temperature, conductivity, dissolved oxygen, ORP, salinity, and turbidity, were collected and recorded prior to the collection of the analytical sample.

## **2.3 ANALYTICAL METHODS**

Groundwater samples were collected at 33 monitoring well locations and two active pumping wells. All 35 wells including DNR-1, DNR-4D, DNR-6, DNR-7, GW-4D, GW-5I, GW-6D, GW-17I, GW-17D, GW-18, GW-19S, GW-19D, GW-20D, GW-20I, GW-21S, GW-21D, GW-22S, GW-22I, GW-22D, GW-23S, GW-23I, GW-23D, GW-24I, GW-24D, GW-25I, GW-25D, GW-26I, GW-26D, MW-3I, MW-102D, MW-103S, PW-7, PW-8, RW-1D, and RW-5S were analyzed for the following parameters by Trimatrix Laboratories, of Grand Rapids, Michigan:

- Volatile Organic Compounds (VOCs) by United States Environmental Protection Agency (USEPA) Method 8260B



- Biogeochemical Parameters:
  - Dissolved gases (methane, ethane, ethene) by RSK 175
  - Inorganics (ammonia, nitrate/nitrite, sulfate, chloride) by USEPA 300 Series Methods
  - Total organic carbon (TOC), and alkalinity (total) by USEPA Series 300 and 400 Methods

In addition to the laboratory analytical methods listed above, groundwater from each well was measured in the field for sulfide and dissolved metals (iron and manganese). These field measurements were obtained using colorimetric methods with a Hach DR 850 instrument, after the well was purged and the field parameters had stabilized.

## 2.4 QUALITY ASSURANCE/QUALITY CONTROL SAMPLES

Quality assurance quality control (QA/QC) samples were collected to monitor the effectiveness of the decontamination procedures and to identify any field or laboratory conditions that may affect sample integrity. QA/QC samples included the following:

- **Duplicate Samples** - Duplicate samples were collected from four monitoring wells. The wells selected for duplicate sample collection were DNR-7, GW-19S, GW-23I, and GW-26I. For each sample obtained, a duplicate set of sample containers was filled immediately following collection of the original sample. Each duplicate sample was handled and analyzed in a fashion identical to the monitoring well samples.
- **Rinsate Samples** - Three rinsate (equipment blank) samples were collected following standard decontamination procedures. Equipment blank samples were collected at a frequency of one sample per day when non-dedicated equipment was being used. For each equipment blank sample, deionized water was poured through the decontaminated sampling equipment and collected in a set of sample containers. Each equipment blank sample was handled and analyzed in a fashion identical to the monitoring well samples.
- **Matrix Spike/Matrix Spike Duplicates (MS/MSD)** - MS/MSD samples were collected from two monitoring wells. The wells selected for MS/MSD sample collection included GW-20D and GW-25D. For each sample, one additional set of sample containers was filled immediately following the collection of the corresponding original sample and submitted for laboratory QA/QC purposes. Each MS/MSD sample was handled and analyzed in a fashion identical to the monitoring well samples.
- **Field Blank Samples** - Two field blank samples were collected during the sampling event. Field blank samples were collected at a frequency of one for every two days of

sampling. Field blank samples were collected by filling a set of VOC bottles with laboratory de-ionized water and leaving the caps off the bottle while conducting the sampling at a monitoring well. Field blank samples were collected during the sampling of wells GW-6D and GW-22D.

- **Trip Blank Samples** - One laboratory-prepared trip blank sample was transported with each cooler containing more than one groundwater sample submitted for VOC analysis. The trip blank sample was only analyzed for VOCs.

All QA/QC and monitoring well samples were placed directly into appropriately preserved sample containers, as prepared and provided by the analytical laboratory. All sample bottles were labeled, packed in coolers, and transported to the analytical laboratory under proper chain-of-custody procedures.

### **3.0 GROUNDWATER MONITORING RESULTS**

A total of 33 groundwater monitoring wells and two active pumping wells were purged and sampled during the September 2006 Quarterly groundwater monitoring event. All samples were analyzed for VOCs and biogeochemical indicator parameters. A total of 17 QA/QC samples including equipment blanks, field blanks, duplicates, MS/MSDs, and trip blanks were also collected.

VC, TCE, and cis-1,2-DCE are the primary VOCs at the Site based on the detected concentrations and frequency of detections in groundwater. The concentrations of these and other VOCs detected during the September monitoring event are summarized in Table 2. A summary of historically detected VOCs is provided as Table 3.

The September 2006 annual groundwater monitoring results are summarized and discussed in the following sections.

#### **3.1 GROUNDWATER ELEVATIONS**

Water levels were measured in 99 groundwater monitoring wells on September 22, 2006. These water level data are summarized in Table 1.

In September 2006, groundwater elevations decreased an average of 0.20 feet across the Site since the last monitoring event in June 2006. The groundwater level elevations ranged from 1,011.25 ft. AMSL at well RW-10, located in the central portion of the property, to 980.27 feet AMSL at monitoring well GW-26I, located off-Site and east of the northeast corner of the Site. The groundwater flow direction on-Site is generally from south to north at a horizontal gradient of approximately 0.001 feet/foot (ft/ft) across the southern and central portions of the property. The groundwater flow direction becomes more northeasterly near the northern property boundary (near wells DNR-6 and GW-10) and a strong easterly component becomes apparent between well cluster MW-102 and well cluster GW-19 (Figure 2). The groundwater gradient increases to approximately 0.005 ft/ft between these two well clusters.

### 3.2 FIELD PARAMETERS

Groundwater field parameters monitored during well purging activities included temperature, pH, conductivity, dissolved oxygen, turbidity, and ORP. When these parameters stabilize, the purge water is then considered to be representative of groundwater conditions within the water-bearing unit. A general discussion and summary of the stabilization parameters recorded during purging is provided below.

- **Temperature:** Groundwater temperatures ranged from 9.78 (GW-6D) to 13.30 (DNR-6) °C.
- **pH:** Groundwater pH ranged from 7.13 (PW-7) to 9.70 (GW-26D).
- **Conductivity:** Groundwater conductivities ranged from 288 (GW-26D) to 687 (PW-7) micro siemens per centimeter (µS/cm).
- **Dissolved Oxygen:** Dissolved oxygen values ranged from 0.06 (GW-20D) to 2.50 (GW-23D) mg/L.
- **Turbidity:** Groundwater turbidity ranged from less than 0.0 (GW-17D) to 47.3 (MW-103S) nephelometric turbidity units (NTUs).
- **ORP:** Groundwater ORP ranged from -104 (RW-5S) to +288 (GW-22D) millivolts (mV).

The field parameters recorded during the September 2006 annual sampling event are generally consistent with historical observations. The low dissolved oxygen and ORP values observed in most monitoring wells is indicative of ambient anaerobic conditions.

### 3.3 ANALYTICAL RESULTS

The VOC concentrations detected in September 2006 Quarterly are summarized in Table 2. A table showing historical VOC concentrations is provided as Table 3.

The VOC analytical results are compared to the TCLs developed in the ROD (EPA, September 30, 1987). These TCLs are further subdivided into Phase I and Phase II TCLs as identified in the *Remedial Design and Remedial Action Work Plan* (Fred C. Hart Associates, Inc., et al, September 18, 1989). The detected VOC concentrations were also compared to the current MDEQ Remediation and Redevelopment Division (MDEQ-RRD) Part 201 Generic Cleanup

(Part 201) Residential Drinking Water, Groundwater Surface Water Interface (GSI), Groundwater Contact Criteria, as well as the 2004 Federal Drinking Water Maximum Contaminant Levels (MCLs).

In general, VOCs were detected in fourteen of the thirty-five wells sampled in September 2006 (Table 2). No VOCs were detected in twenty-one monitoring wells (DNR-1, DNR-4D, GW-4D, GW-6D, GW-19D, GW-20I, GW-21S, GW-21D, GW-22S, GW-22I, GW-22D, GW-23S, GW-23I, GW-23D, GW-24I, GW-24D, GW-25I, GW-25D, GW-26I, GW-26D, and MW-102D). VOCs that were detected, but did not exceed the Part 201 Criteria, MCLs, or the ROD TCLs, include chlorobenzene, chloroethane, 1,1-dichloroethane, trans-1,2-dichloroethene, ethylbenzene, and 1,1,1-trichloroethane. The detected VOCs that exceeded one or more ROD TCL, Part 201, and/or MCL criterion are summarized below.

#### **3.3.1 VINYL CHLORIDE**

Vinyl chloride (VC) is the most prevalent VOC at the Site, detected in 12 of the 35 wells sampled during this monitoring event. The detected VC concentrations in groundwater samples ranged from 1.1 µg/L (RW-5S) to 160 µg/L (GW-5I). The dissolved VC plume begins near well PW-3 (located southeast of the groundwater treatment system building) and extends north to northeast to the property boundary near wells GW-19S and GW-20D (Figure 4). The VC concentrations detected in groundwater across the Site between June 2004 and September 2006 are summarized on the following table. A map showing the historical distribution of VC concentrations across the Site is provided as Figure 5.

ROD TCLs for Vinyl Chloride		2004 Federal Drinking Water MCL for Vinyl Chloride ( $\mu\text{g/L}$ )	Part 201 Criteria for Vinyl Chloride ( $\mu\text{g/L}$ )		
Phase I TCLs	Phase II TCLs		Residential Drinking Water	Groundwater Surface Water	Groundwater Contact Criteria
1	0.003	2	2	15	1,000
Well ID	Monitoring Event	Observed Vinyl Chloride Concentrations ( $\mu\text{g/L}$ )			
DNR-6	December 2005	Frozen			
	April 2006	30			
	June 2006	33			
	September 2006	35			
DNR-7	December 2005	130			
	April 2006	120			
	June 2006	110			
	September 2006	95			
GW-5I	December 2005	200			
	April 2006	160			
	June 2006	140			
	September 2006	160			
GW-6D	December 2005	7.2			
	April 2006	1.2			
	June 2006	ND			
	September 2006	ND			
GW-17I	December 2005	Frozen			
	April 2006	19			
	June 2006	9			
	September 2006	9.4			
GW-17D	December 2005	Frozen			
	April 2006	20			
	June 2006	20			
	September 2006	21			
GW-18	December 2005	Frozen			
	April 2006	38			
	June 2006	43			
	September 2006	13			
GW-19S	December 2005	Frozen			
	April 2006	7.5			
	June 2006	5.6			
	September 2006	2.6			

ROD TCLs for Vinyl Chloride		2004 Federal Drinking Water MCL for Vinyl Chloride ( $\mu\text{g/L}$ )	Part 201 Criteria for Vinyl Chloride ( $\mu\text{g/L}$ )		
Phase I TCLs	Phase II TCLs		Residential Drinking Water	Groundwater Surface Water	Groundwater Contact Criteria
1	0.003	2	2	15	1,000
Well ID	Monitoring Event	Observed Vinyl Chloride Concentrations ( $\mu\text{g/L}$ )			
GW-20D	December 2005	25			
	April 2006	26			
	June 2006	24			
	September 2006	20			
MW-2I	June 2004	24			
	June 2005	21			
	June 2006	20			
MW-3I	December 2005	26			
	April 2006	28			
	June 2006	28			
	September 2006	27			
PW-1	June 2004	86			
	June 2005	31			
	June 2006	20			
PW-3	June 2004	5.9			
	June 2005	2.4			
	June 2006	1.7			
PW-4	June 2004	7.7			
	June 2005	5.3			
	June 2006	3.7			
PW-6	June 2004	87			
	June 2005	71			
	June 2006	24			
PW-7	December 2005	Not Sampled			
	April 2006	100			
	June 2006	45			
	September 2006	88			
PW-8	December 2005	Not Sampled			
	April 2006	4.3			
	June 2006	2.4			
	September 2006	4.2			

ROD TCLs for Vinyl Chloride		2004 Federal Drinking Water MCL for Vinyl Chloride (µg/L)	Part 201 Criteria for Vinyl Chloride (µg/L)		
Phase I TCLs	Phase II TCLs		Residential Drinking Water	Groundwater Surface Water	Groundwater Contact Criteria
1	0.003	2	2	15	1,000
Well ID	Monitoring Event	Observed Vinyl Chloride Concentrations (µg/L)			
RW-1D	December 2005	2.1			
	April 2006	ND			
	June 2006	ND			
	September 2006	ND			
RW-5S	December 2005	2.4			
	April 2006	1.7			
	June 2006	1.4			
	September 2006	1.1			

Notes:

MCL = Maximum Contaminant Level

Shaded areas indicate that the concentration exceeds the MCL Part 201 or ROD Criteria.

Although VC concentrations over time vary between different individual monitoring wells, the general distribution of VC across the Site has remained relatively consistent. Graphs showing detailed VC, TCE, and cis-1,2-DCE concentration trends over time (for wells with detectable concentrations of these VOCs) are provided as Figures 6 through 26. Overall decreasing VC concentration trends are apparent in monitoring wells GW-5D, GW-6D, MW-3I, RW-5S, RW-5D, PW-1, PW-3, PW-6, PW-7, and PW-8. With the exception of RW-5S and RW-5D, these wells are all located in the vicinity of pumping wells PW-1, PW-4, and PW-6. RW-5S and RW-5D are located in the vicinity of pumping well PW-3. Overall increasing VC concentration trends are seen in monitoring wells GW-18 and GW-20D, which are both located in the northeastern portion of the Site. However, the VC concentration in GW-18 has decreased significantly (from 43 µg/L to 13µg/L) since the June 2006 sampling event. The VC concentration at wells DNR-6, DNR-7, GW-5I, GW-17I, GW-17D, GW-19S, MW-2I, and MW-103S are generally stable. Of note however, between the July and September 2005 sampling events, several wells show either a sharp increase (RW-5S located near PW-3, GW-17I, and to a lesser extent GW-19S,



located down gradient of the northernmost pumping wells PW-4 and PW-6) or decrease (GW-17D) in VC concentrations. The groundwater treatment system was not operating for two months, between August 1 and October 1 2005, for maintenance of the air stripping tower. The concentration changes observed in the wells noted above may be associated with the period of system inactivity. Over the past quarter the system did not have a great deal of inactivity, and the periods of inactivity do not appear to have affected VC concentrations greatly. PW-4 was the only well with an extended period of inactivity between July and August 2006, and monitoring wells near this pumping well did not appear to be affected. Concentrations have either remained constant or slightly increased between June 2006 and September 2006. The system performance during this quarter is further discussed in Section 5.0.

Table 3 and Figure 5 present historical VC data. To date, VC has not been observed in the off-Site well clusters GW-22I/S/D, GW-23I/S/D, GW-24I/D GW-25I/D and GW-26I/D, located further down gradient. With the exception of low concentrations of carbon disulfide and toluene, VOCs have not been detected at these off-site wells.

### 3.3.2 CIS-1,2-DICHLOROETHENE

Concentrations of cis-1,2-dichloroethene (cis-1,2-DCE) were detected in groundwater samples collected from five of the 35 wells sampled in September 2006. The cis-1,2-DCE concentrations ranged from 2.1  $\mu\text{g/L}$  at well PW-8 to 220  $\mu\text{g/L}$  at well DNR-7. The wells where cis-1,2-DCE was detected, and the reported concentrations, are provided in the table below. cis-1,2-DCE is typically observed in the north central portion of the site.

2004 Federal Drinking Water MCL for cis-1,2- DCE  ( $\mu\text{g/L}$ )	MDEQ Part 201 Residential Drinking Water Criteria for cis-1,2-DCE  ( $\mu\text{g/L}$ )	cis-1,2-DCE  Analytical Results ( $\mu\text{g/L}$ )  September 2006				
		DNR-7	MW-103S	PW-7	PW-8	RW-1D
70	70	220	3.9	74	2.1	18

Notes:

MCL = Maximum Contaminant Level

Shaded areas indicate that the concentration exceeds the MCL Part 201 Criteria.  
No ROD TCLs were established for cis-1,2-DCE.

Graphs showing detailed VC, TCE, and cis-1,2-DCE concentration trends over time (for wells with detectable concentrations of these VOCs) are provided as Figures 6 through 28. Over the last several sampling events the cis-1,2-DCE concentrations, where detected, have remained generally stable with a few exceptions. Overall slight decreasing concentration trends are evident in wells RW-5S, GW-5D, PW-7 and PW-8 since 2004. However, concentrations in PW-7 and PW-8 have increased since the June 2006 sampling event.

### 3.3.3 TRICHLOROETHENE

Trichloroethene (TCE) was detected in groundwater samples collected from two of the 35 wells sampled in September 2006. The detected concentrations ranged from 5.2 µg/L at well PW-8 and 62 µg/L at well RW-1D. The wells where TCE was detected, and the reported concentrations, are provided in the table below. TCE and VC isoconcentration contours are shown in Figure 4.

ROD TCLs for TCE		2004 Federal Drinking Water MCL for TCE (µg/L)	Part 201 Residential Drinking Water Criteria for TCE (µg/L)	TCE Analytical Results (µg/L)  September 2006	
Phase I TCLs (µg/L)	Phase II TCLs (µg/L)			RW-1D	PW-8
1.5	0.627	5	5	62	5.2

Notes:

MCL = Maximum Contaminant Level

Shaded areas indicate that the concentration exceeds the ROD, MCL, or Part 201 Criteria.

The TCE concentrations reported in September 2006 are generally consistent with those observed in recent sampling events. The apparent spike in TCE concentrations at well RW-1D in April 2006 (from 61 µg/l in December 2005 to 150 µg/l in April 2006) has stabilized to concentrations consistent with historical concentrations for this well (June 2006 43 µg/l and September 2006 62 µg/L). To date, the furthest down gradient location at which TCE has been routinely detected is at pumping well PW-8. TCE has not been observed at any of the newest down gradient wells and boundary wells, including the GW-17, GW-18, GW-19, GW-20 and GW-21 series, or any of the off-Site monitoring wells. A map showing the historical distribution of TCE and VC concentrations across the Site is provided as Figure 5.

Graphs showing detailed VC, TCE, and cis-1,2-DCE concentration trends over time (for wells with detectable concentrations of these VOCs) are provided as figures 6 through 28. In the wells where TCE has historically been detected, overall decreasing trends are evident in monitoring wells RW-5S, and pumping well PW8, while the TCE concentrations at RW-1D have remained relatively stable.

#### **3.3.4 BENZENE**

Benzene was detected in the groundwater sample collected from one of the 35 wells sampled. The detected concentration of benzene in PW-7 was 7.6 µg/L. Benzene is sporadically observed in the central portion of the site. An isoconcentration map for benzene was not prepared. The occurrence of benzene is generally consistent with previous sampling events.

### **3.3.5 BIOGEOCHEMICAL DATA**

All 35 groundwater samples collected in September 2006 were analyzed for biodegradation indicators including methane, ethane, ethene, nitrate/nitrite, ammonia, chloride, sulfate, total alkalinity, and total organic carbon. Additional biogeochemical parameters were collected in the field from all wells, including dissolved oxygen, ORP, dissolved iron, dissolved manganese, and sulfide. These parameters are used to determine the aerobic/anaerobic condition of the aquifer. In general, electron acceptors progress from oxygen to nitrate, manganese, iron, sulfate and methane, with oxygen indicating the aerobic end of the scale and methane indicating the anaerobic end of the scale.

A summary of the September 2006 biogeochemical results is provided in Table 4. The dissolved metals analytical results are also provided in Table 4. A summary of the biogeochemical and metals results obtained during this sampling event is provided as follows:

#### **Field Measurements**

**Dissolved Oxygen:** Dissolved oxygen values ranged from 0.06 (GW-20D) to 2.50 (GW-23D) mg/L (see Section 3.2).

**ORP:** Groundwater ORP ranged from -104 (RW-5S) to +288 (GW-22D) millivolts (mV) (see Section 3.2).

**Sulfide:** Sulfide concentrations ranged from 0.00 mg/L (multiple wells) to 0.80 mg/L (GW-23I & GW-23D).

**Dissolved Iron:** Dissolved iron concentrations ranged from 0.01 mg/L (GW-23I) to 8.23 mg/L (RW-5S).

**Dissolved Manganese:** Dissolved manganese concentration ranged from 0.0 mg/L (GW-19S) to 3.6 mg/L (GW-21D).

#### **Laboratory Results**

**Methane:** Methane was detected in 33 of 35 wells sampled, at concentrations ranging from 1.2 µg/L (GW-19D) to 560 µg/L (MW-102D).

**Ethane:** Ethane was detected in one of the 35 wells sampled. Ethane was detected in GW-26D at a concentration of 8.2 µg/L.

**Ethene:** Ethene was detected in eight of the 35 wells sampled at concentrations ranging from 1.2 µg/L (GW-18) to 8.7 µg/L (PW-7).

**Nitrate:** Nitrate was detected in two of the 35 wells sampled at concentrations of 0.15 mg/L at GW-22D and 0.17 mg/L at PW-8.

**Nitrite:** Nitrite was not detected in any of the wells sampled.

**Sulfate:** Sulfate was detected in 30 of the 35 wells sampled, at concentrations ranging from 5.5 (GW-23D) to 31 mg/L (GW-19D).

**Ammonia:** Ammonia was detected in 29 of the 35 wells sampled at concentrations ranging from 0.050 mg/L (GW-23I) to 0.24 mg/L (DNR-1).

**Chloride:** Chloride concentrations ranged from 1.3mg/L (DNR-1) to 13 mg/L (GW-26D).

**Total Alkalinity:** Total alkalinity concentrations ranged from 100 mg/L (GW-26D) to 340 mg/L (PW-8).

**Total Organic Carbon:** Total organic carbon content ranged from below the reporting limit of 1.0 mg/L (RW-5S) to 22 mg/L (GW-26D).

Based on a review of these data, the aquifer appears to be under predominantly anaerobic conditions, although neither strongly anaerobic nor aerobic conditions are apparent. Weakly aerobic conditions, as indicated by the elevated DO and ORP levels are present in DNR-6, GW-22D, GW-23S, GW-23D, and GW-26I. Elevated concentrations of methane in DNR-7, GW-17D, MW-102D, PW-7 and RW-1D suggest that methanogenesis (anaerobic degradation) may be occurring at these locations. The overall low values for ORP are more indicative of anaerobic conditions.

### **3.4 QA/QC RESULTS**

Analytical results for the QA/QC samples collected during the September 2006 sampling event are summarized below.

#### **Trip Blanks**

Six trip blank samples were submitted to the lab for analysis of VOCs. All six samples contained no detectable concentration of any VOC. Therefore no data qualification is necessary based on trip blank samples. None of the seven trip blank samples had elevated reporting limits (RLs).

#### **Field Blanks**

Two field blank samples were submitted to the laboratory for analysis of VOCs. Both samples contained no detectable concentration of any VOC. Neither of the field blank samples had elevated reporting limits (RLs).

#### **Equipment Blanks**

Three equipment blank samples were submitted to the laboratory for analysis of VOCs. Two of the samples contained non-detectable concentrations of all VOCs. The equipment blank collected on September 25 contained chloroform at 1.2 µg/L. However, none of the samples collected on September 25 contained detectable concentrations of chloroform. Therefore no qualification based on this detection is needed. None of the three equipment blank samples had elevated reporting limits (RLs).

#### **Duplicate Samples**

Duplicate samples (GW19S/GW19R, GW23I/GW-23R, and GW26I/GW26R) were reviewed for field precision within 50% relative percent difference (RPD).

#### **Laboratory Method Blanks**

All laboratory method blanks were non-detect for all VOCs. No samples were qualified because of method blanks.

#### **Laboratory Control Samples**

The laboratory control sample (LCS) for batch 0609321 was lower than the laboratory control limit for cis-1,3-dichloropropane. The LCS or laboratory control sample duplicate (LCSD) for batch 0609321 exceeded the upper control limit for bromomethane, chloroethane, chloromethane and vinyl chloride. All four compounds were non-detect in the affected samples, therefore no affected data were qualified as a result of this exceedance. The LCS or LCSD for batch 0609366 exceeded the upper control limit for bromomethane, chloroethane, chloromethane and vinyl chloride. All four compounds were non-detect in the affected samples, therefore no affected data were qualified as a result of this exceedance.

### **MS/MSDs**

In one sample (GW-25D) the matrix spike and/or the matrix spike duplicate (MS/MSD) recoveries were outside of control limits. The non-spiked sample for GW-25D was qualified with an estimated flag for carbon tetrachloride, cis-1,3-dichloropropane, trans-1,3-dichloropropane, dibromochloromethane, and tetrahydrofuran. However, none of the affected compounds were detected at concentrations above the method detection limit.

### **Holding Times**

All groundwater samples were analyzed within the recommended holding times for each analysis.

#### **4.0 SUMMARY OF SEPTEMBER 2006 GROUNDWATER MONITORING EVENT**

Water levels were collected from a total of 99 groundwater monitoring wells on September 22, 2006. Purging and sampling activities were performed on 23 on-site and 12 off-site wells between September 18 and 26, 2006 following appropriate technical and quality control procedures. All groundwater samples were submitted to Trimatrix Laboratories for analysis. All samples were analyzed within recommended holding times following strict quality control procedures.

In September 2006, groundwater elevations decreased an average of 0.20 feet since the last monitoring event in June 2006. The groundwater flow direction on-Site is generally from south to north in the southern and central portions of the property. The groundwater flow direction becomes more northeasterly near the northern property boundary (near wells DNR-6 and GW-10) and a strong easterly component becomes apparent between well cluster MW-102 and well cluster GW-19 (Figure 2). The groundwater gradient increases to approximately 0.005 ft/ft between these two well clusters. Groundwater flow may extend eastward from the area near GW-19 toward off-Site wells near Demode Road; however, only toluene has been detected in any groundwater monitoring wells on the east side of the wetland, despite the low level occurrence of VC in one off-Site private supply well (510 Demode).

The distribution of dissolved VOCs in the aquifer is generally consistent with historical patterns. Overall, concentrations of TCE, cis-1,2-DCE, and VC are either stable or decreasing across the Site, with the exception of wells GW-18 and GW-20D, located near the northeastern property corner. VC concentrations in these wells continue to show an overall increasing trend.

Several groundwater monitoring wells located in the vicinity of pumping wells PW-3, PW-4 and PW-6, including RW-5S, GW-17I, GW-17D, and to a lesser extent, GW-19S, show distinct VC concentration changes between July and September 2005 which may be related to the treatment system down time between August and October 2005.



## **5.0 GROUNDWATER EXTRACTION AND TREATMENT SYSTEM PERFORMANCE**

The groundwater extraction and treatment system consists of six extraction wells and an air stripping system that is designed to remove VOCs from groundwater. The extraction well network was reconfigured in March 2004. Extraction well PW-9 was replaced with PW-3, and PW-5 was replaced with PW-1. The current active extraction wells are PW-1, PW-3, PW-4, PW-6, PW-7, and PW-8. Periodic monitoring of the treated and untreated groundwater is conducted in accordance with the Michigan Department of Environmental Quality (MDEQ) Substantive Requirements Document for Surface Water Discharge (Permit No. MIU990014).

### **5.1 COMPLIANCE**

Table 5 provides a summary of the influent and effluent analyses, and weekly average air emission rates for the three-month period from July 1, 2006 through September 30, 2006. The weekly monitoring data indicates that the treatment system effluent was compliant with Section A.1 of the Substantive Requirements Document MIU990014.

Average hourly air emission rates from the groundwater treatment system for each weekly sampling period from the air stripper were calculated for the current reporting period (July 1, 2006 through September 30, 2006). The air emission rates for the air stripper system ranged from 0.0022 to 0.0055 pounds per hour (lbs/hr) during this reporting period (Table 5). The permitted allowable emissions for both the SVE and air stripper systems are 1.0 lbs/hr VOC.

### **5.2 SYSTEM MODIFICATIONS**

In an effort to increase groundwater capture by the groundwater pump and treat system, three existing pumps in extraction wells PW-1, PW-4 and PW-6 will be replaced by new, larger, submersible pumps. The wells will be fitted with the following new pumps:

- PW-1 and PW-6 – Existing submersible pump at each well will be replaced with a Grundfos 150S150-8 6-inch pump with 460 volt, 3-phase motor. The new pumps will be operated at approximately 130 and 120 gallons per minute, respectively.

- PW-4 – Existing centrifugal pump will be replaced with a submersible Grundfos 75S75-12 4-inch pump with 460 volt, 3-phase motor. The new pump will be operated at approximately 60 gallons per minute.

Each new pump will be placed approximately 10 to 15-feet above the top of the well screens to maximize the available screen length and minimize incrustation and corrosion of the screened zone in each well.

Once the new pumps are operating, groundwater levels will be monitored closely over a three month period to evaluate increased capture as a result of the system modifications. The system modifications and capture zone monitoring program is summarized in the agency-approved July 21, 2006 Technical Memorandum entitled, *Extraction Well Pumping Rate Increase and Capture Zone Analysis, Rose Township Demode Road Superfund Site, Holly, Michigan* (Earth Tech, July 2006).

### **5.3 SYSTEM OPERATIONS**

The system has removed an estimated 426.69 lbs of VOCs from the groundwater to date since start-up of the groundwater collection and treatment system on February 10, 1996. This quarter, the groundwater treatment system removed 7.36 lbs of VOCs (1.6% of cumulative removal). This corresponds to an average VOC removal rate of 0.0035 lbs/hr for this quarter.

Table 6 provides the total volume of groundwater extracted from the active extraction wells, and percentage of pump operation per month, for the period of July 1, 2006 through September 30, 2006. The following equipment and electrical failures were encountered during this reporting period, which caused down time for two of the extraction wells:

- Pumping well PW-4 was offline from July 10, 2006 to August 21, 2006 because of a malfunctioning booster pump. Following repairs, PW-4 was brought back into service on August 22, 2006.
- The groundwater extraction and treatment system was not operational from September 11, 2006 to September 14, 2006 due to a fault in the electrical supply from DTE Energy.

The groundwater pump and treat system operated an average of greater than 95% over the quarter for all wells except PW-4. PW-4 operated an average of 50% during the quarter. A comparison of contaminant concentration data in surrounding groundwater wells between June 2006 and September 2006 did not show any significant trends which would suggest that system downtime affected groundwater concentrations. Earth Tech will continue to track changes in contaminant concentrations in the wells and attempt to correlate this data with system operation. Earth Tech endeavors to keep system downtime to a minimum.

## **6.0 PLANNED PROJECT ACTIVITIES**

The next two quarterly groundwater sampling events are planned to take place in December 2006 and April 2007. Cleaning of selected pumping wells is tentatively scheduled for spring 2007.

## Figures

# SDMS US EPA Region V

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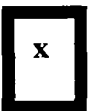
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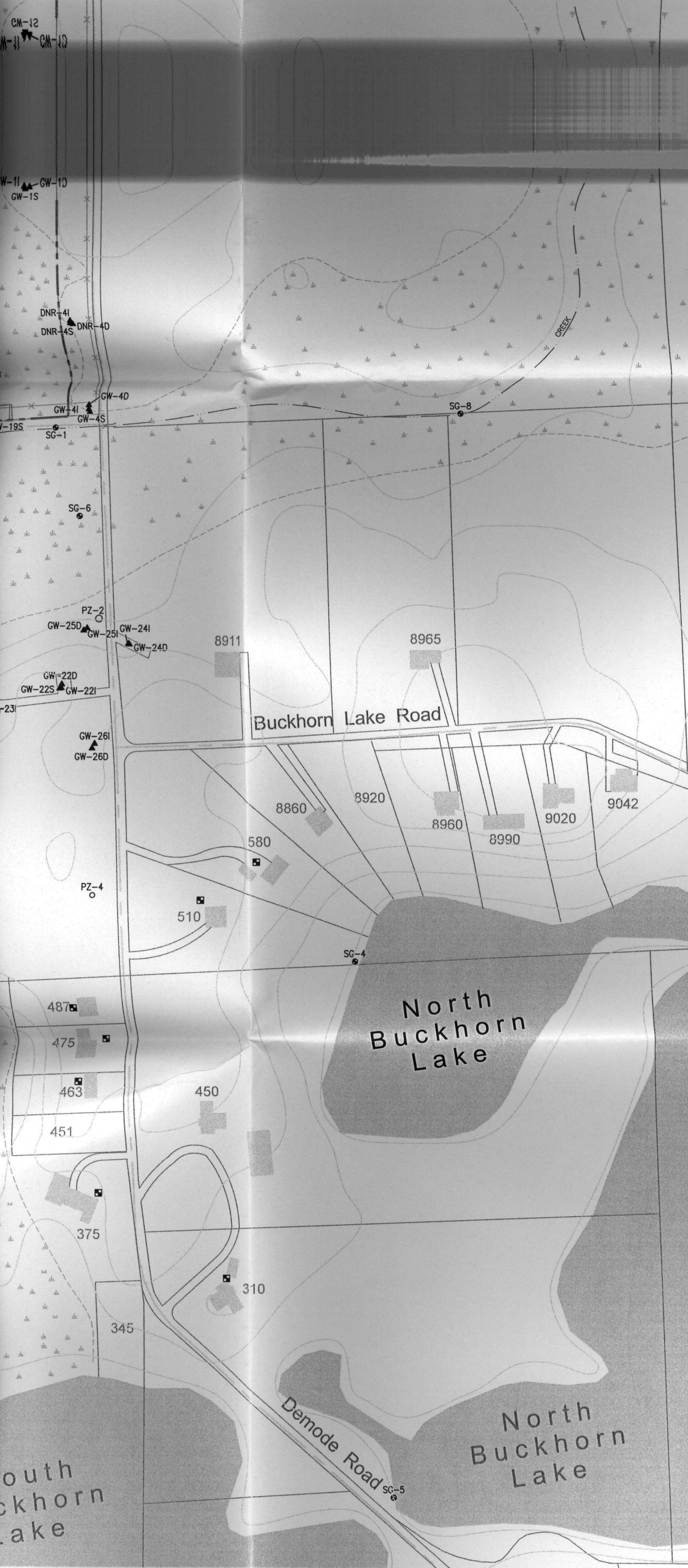
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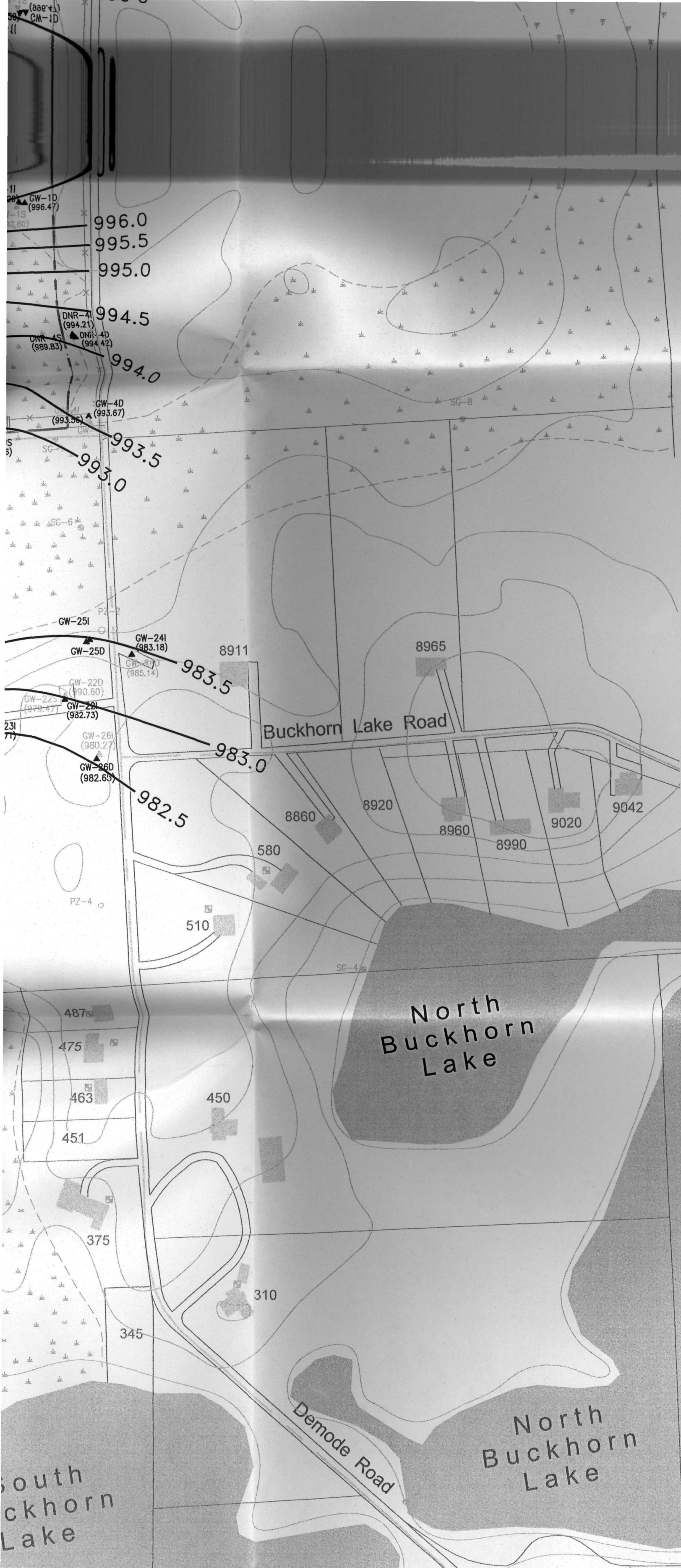
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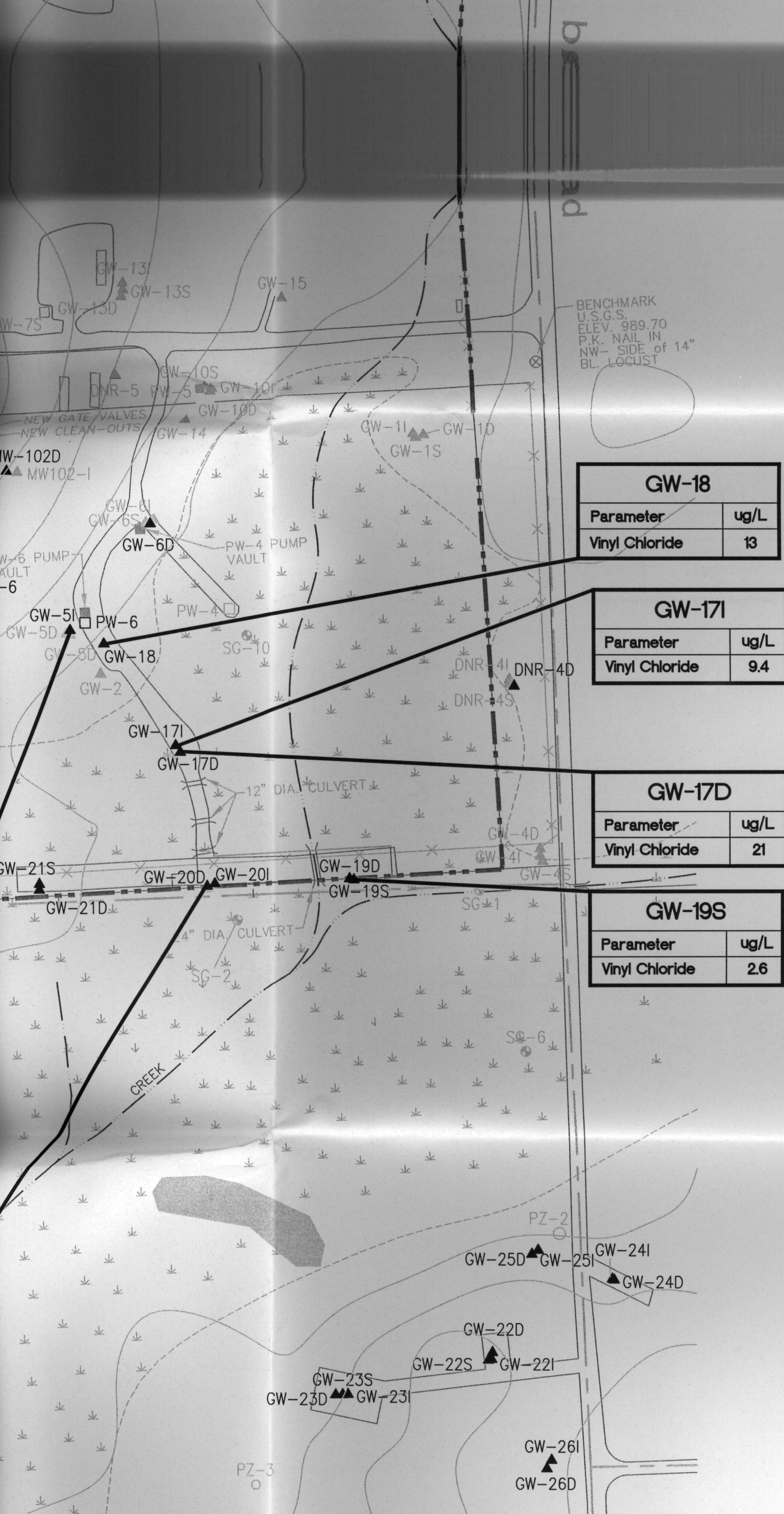
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<div><div></div><div><h1>EarthTech</h1><p>A Tyco International Ltd. Company</p></div></div>							
Rose Township Demode Road Holly, Michigan				Figure 1 Site Map and Well Locations			
DATE		7/06					
PROJECT NO		89861					
FILENAME		89861New Base Map 5-06.dwg					
SHEET NO		1 of 26					
DRAWING NO		1					





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Rose Township Demode Road Holly, Michigan			Figure 2 Groundwater Level Elevation Contours September 2006		
DATE			11/06		
PROJECT NO			89861.02.04		
FILENAME			89861_Q3_2006_Fig2		
SHEET NO			2 of 26		
DRAWING NO			2		





BENCHMARK  
U.S.G.S.  
ELEV. 989.70  
P.K. NAIL IN  
NW- SIDE of 14"  
BL. LOCUST

GW-18	
Parameter	ug/L
Vinyl Chloride	13

GW-17I	
Parameter	ug/L
Vinyl Chloride	9.4

GW-17D	
Parameter	ug/L
Vinyl Chloride	21

GW-19S	
Parameter	ug/L
Vinyl Chloride	2.6

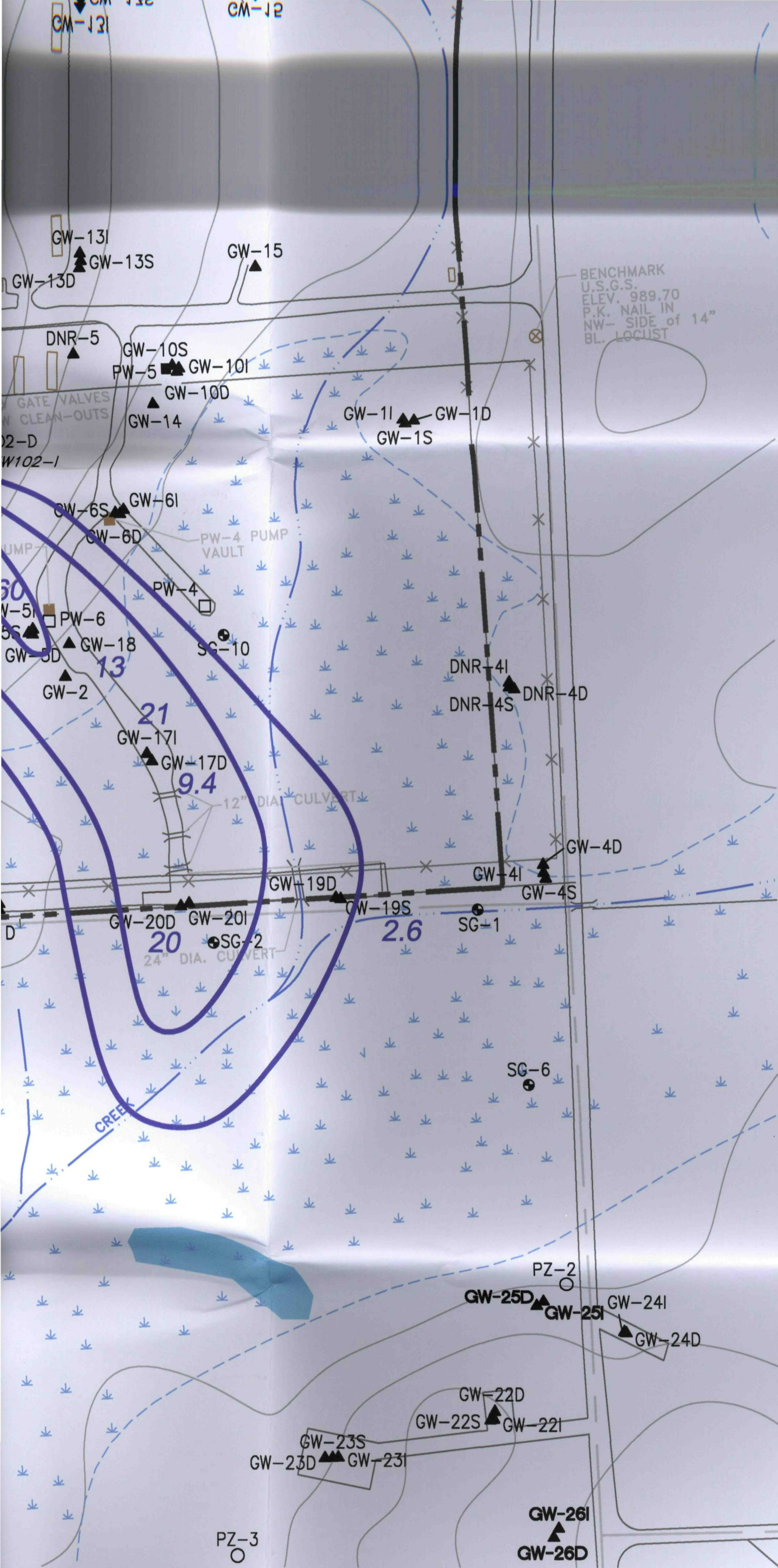
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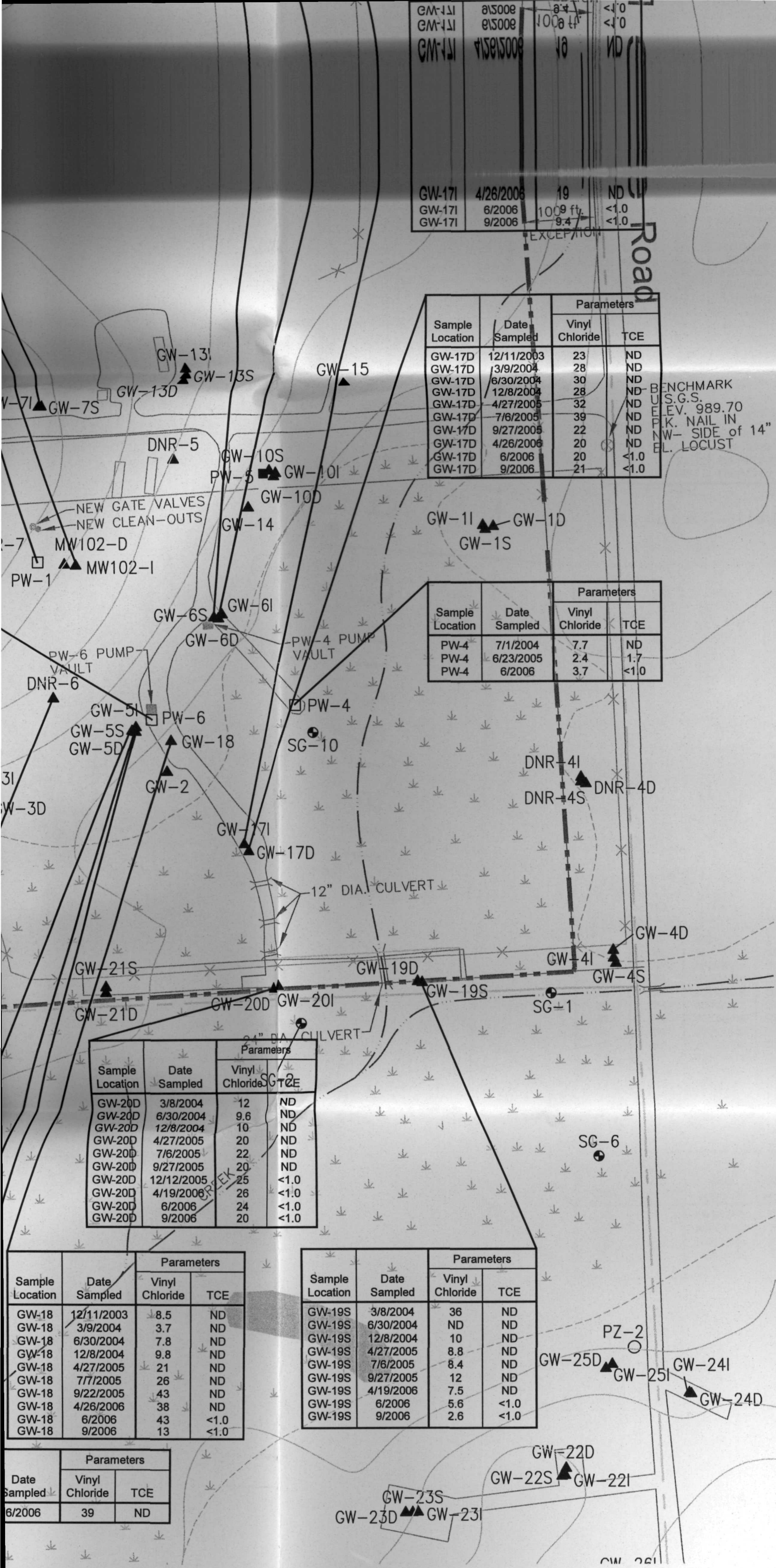
Rose Township Demode Road Holly, Michigan		Figure 3 Summary of Detected Volatile Organic Compounds September 2006	
DATE		11/06	
PROJECT NO		89861.02.04	
FILENAME		89861_Q3_2006_Fig3.dwg	
SHEET NO		3 of 26	
DRAWING NO		3	





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Rose Township Demode Road Holly, Michigan					
Figure 4 VC and TCE Isoconcentration Map September 2006					
DATE					11/06
PROJECT NO					89861.02.04
FILENAME					89861_Q3_2006_Fig4a.dwg
SHEET NO					4 of 26
DRAWING NO					4





GW-17I	4/26/2006	19	ND
GW-17I	6/2006	10.9 ft.	<1.0
GW-17I	9/2006	9.4	<1.0

Sample Location	Date Sampled	Parameters	
		Vinyl Chloride	TCE
GW-17D	12/11/2003	23	ND
GW-17D	3/9/2004	28	ND
GW-17D	6/30/2004	30	ND
GW-17D	12/8/2004	28	ND
GW-17D	4/27/2005	32	ND
GW-17D	7/6/2005	39	ND
GW-17D	9/27/2005	22	ND
GW-17D	4/26/2006	20	ND
GW-17D	6/2006	20	<1.0
GW-17D	9/2006	21	<1.0

Sample Location	Date Sampled	Parameters	
		Vinyl Chloride	TCE
PW-4	7/1/2004	7.7	ND
PW-4	6/23/2005	2.4	1.7
PW-4	6/2006	3.7	<1.0

Sample Location	Date Sampled	Parameters	
		Vinyl Chloride	TCE
GW-20D	3/8/2004	12	ND
GW-20D	6/30/2004	9.6	ND
GW-20D	12/8/2004	10	ND
GW-20D	4/27/2005	20	ND
GW-20D	7/6/2005	22	ND
GW-20D	9/27/2005	20	ND
GW-20D	12/12/2005	25	<1.0
GW-20D	4/19/2006	26	<1.0
GW-20D	6/2006	24	<1.0
GW-20D	9/2006	20	<1.0

Sample Location	Date Sampled	Parameters	
		Vinyl Chloride	TCE
GW-18	12/11/2003	8.5	ND
GW-18	3/9/2004	3.7	ND
GW-18	6/30/2004	7.8	ND
GW-18	12/8/2004	9.8	ND
GW-18	4/27/2005	21	ND
GW-18	7/7/2005	26	ND
GW-18	9/22/2005	43	ND
GW-18	4/26/2006	38	ND
GW-18	6/2006	43	<1.0
GW-18	9/2006	13	<1.0

Sample Location	Date Sampled	Parameters	
		Vinyl Chloride	TCE
GW-19S	3/8/2004	36	ND
GW-19S	6/30/2004	ND	ND
GW-19S	12/8/2004	10	ND
GW-19S	4/27/2005	8.8	ND
GW-19S	7/6/2005	8.4	ND
GW-19S	9/27/2005	12	ND
GW-19S	4/19/2006	7.5	ND
GW-19S	6/2006	5.6	<1.0
GW-19S	9/2006	2.6	<1.0

Date Sampled	Parameters	
	Vinyl Chloride	TCE
6/2006	39	ND

Parameters	
Vinyl Chloride	TCE
150	ND
170	ND
94	ND
210	ND
230	ND
180	ND
220	ND
180	ND
200	<1.0
160	<1.0
140	<1.0

Note:  
1. All concentrations are in µg/L.

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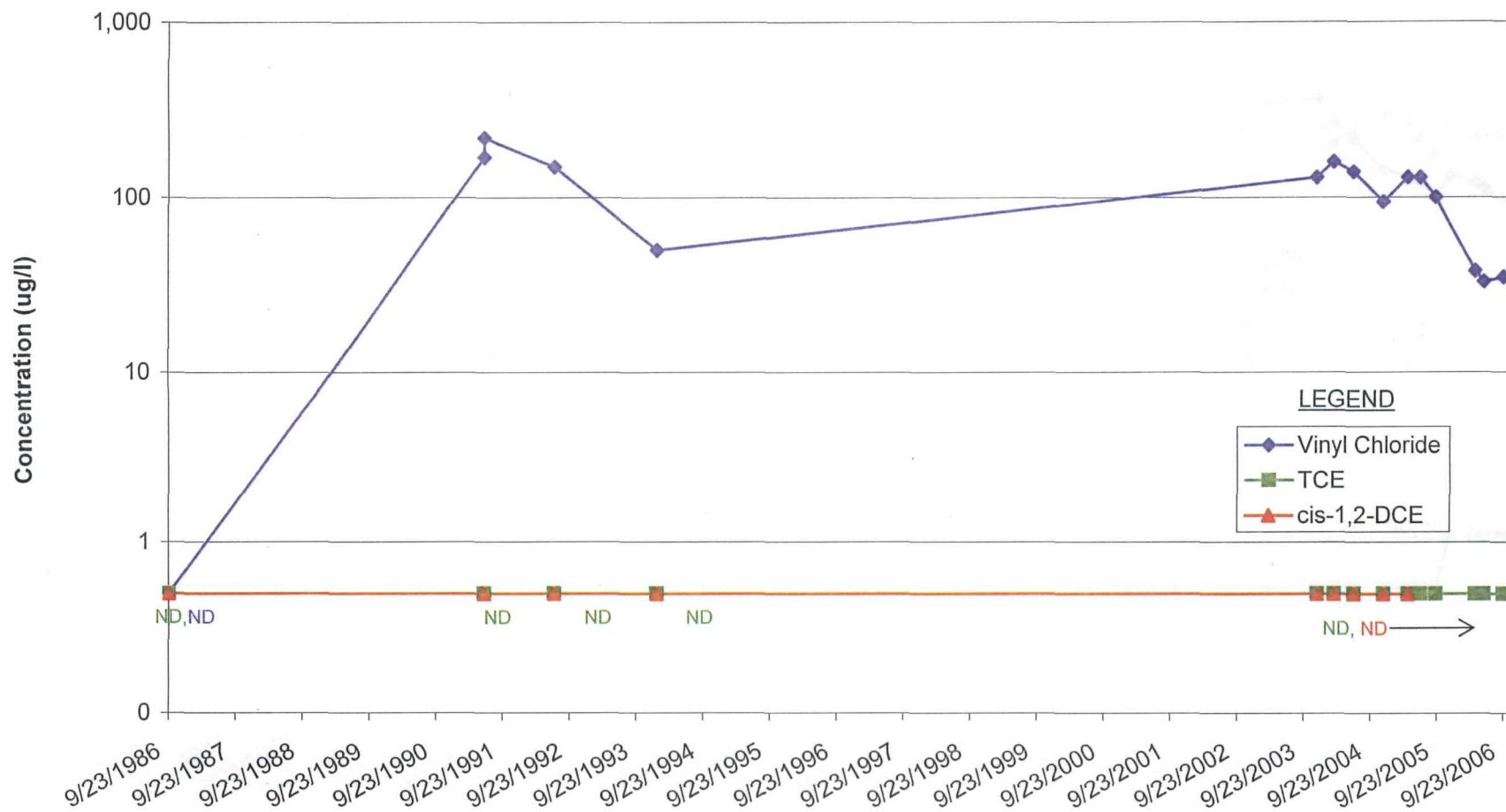


Rose Township Demode Road  
Holly, Michigan

Figure 5  
Summary of Historical TCE and  
VC Concentrations

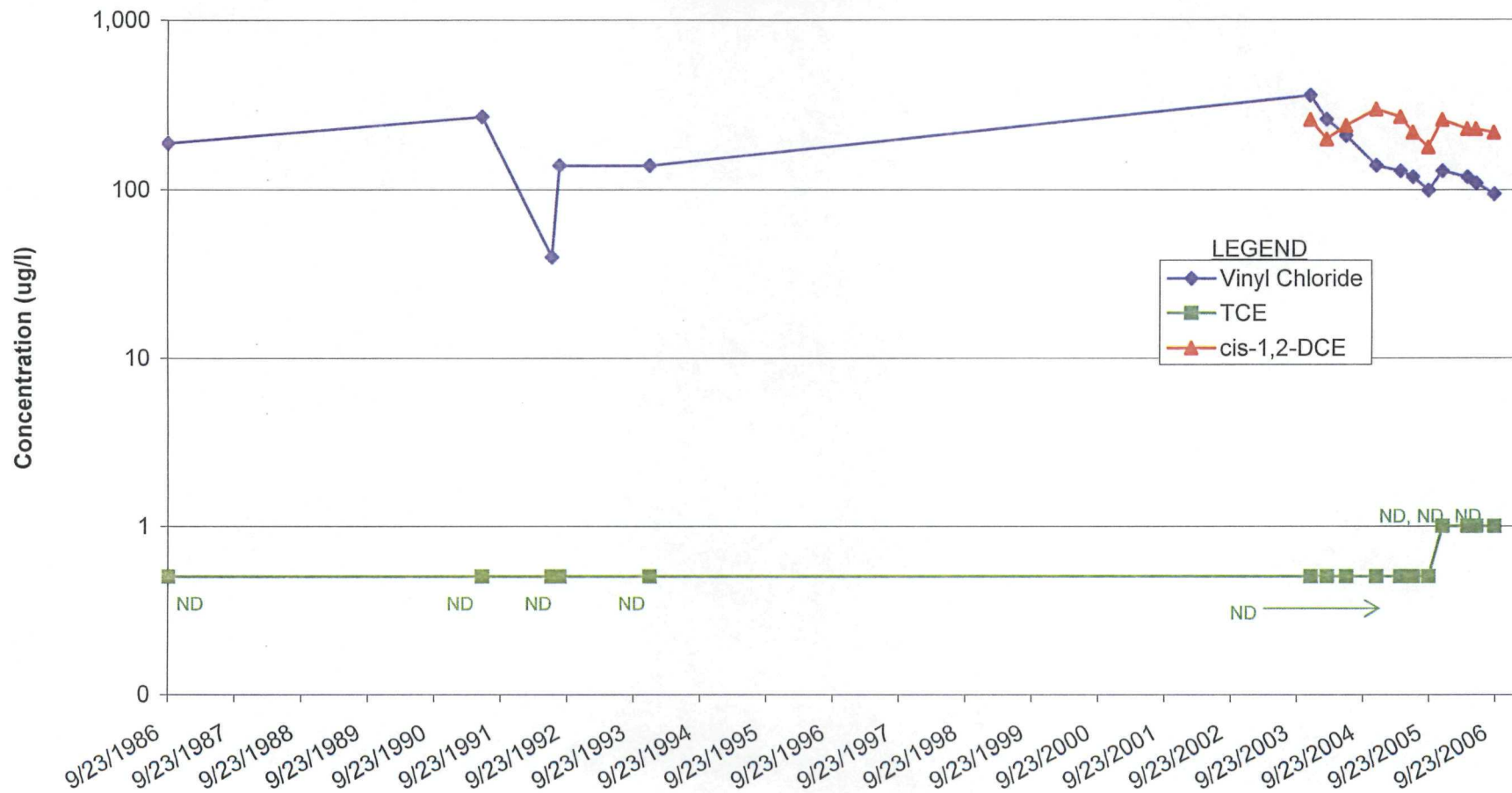
DATE	11/06
PROJECT NO	89861.02.04
FILENAME	89861_Q3_2006_Fig5.dwg
SHEET NO	5 of 26
DRAWING NO	5

**FIGURE 6**  
**DNR-6**  
**VC, TCE, and cis-1,2-DCE Concentrations Over Time**  
**June 2006 Annual Monitoring Event**  
**Rose Township Site**  
**Holly, Michigan**

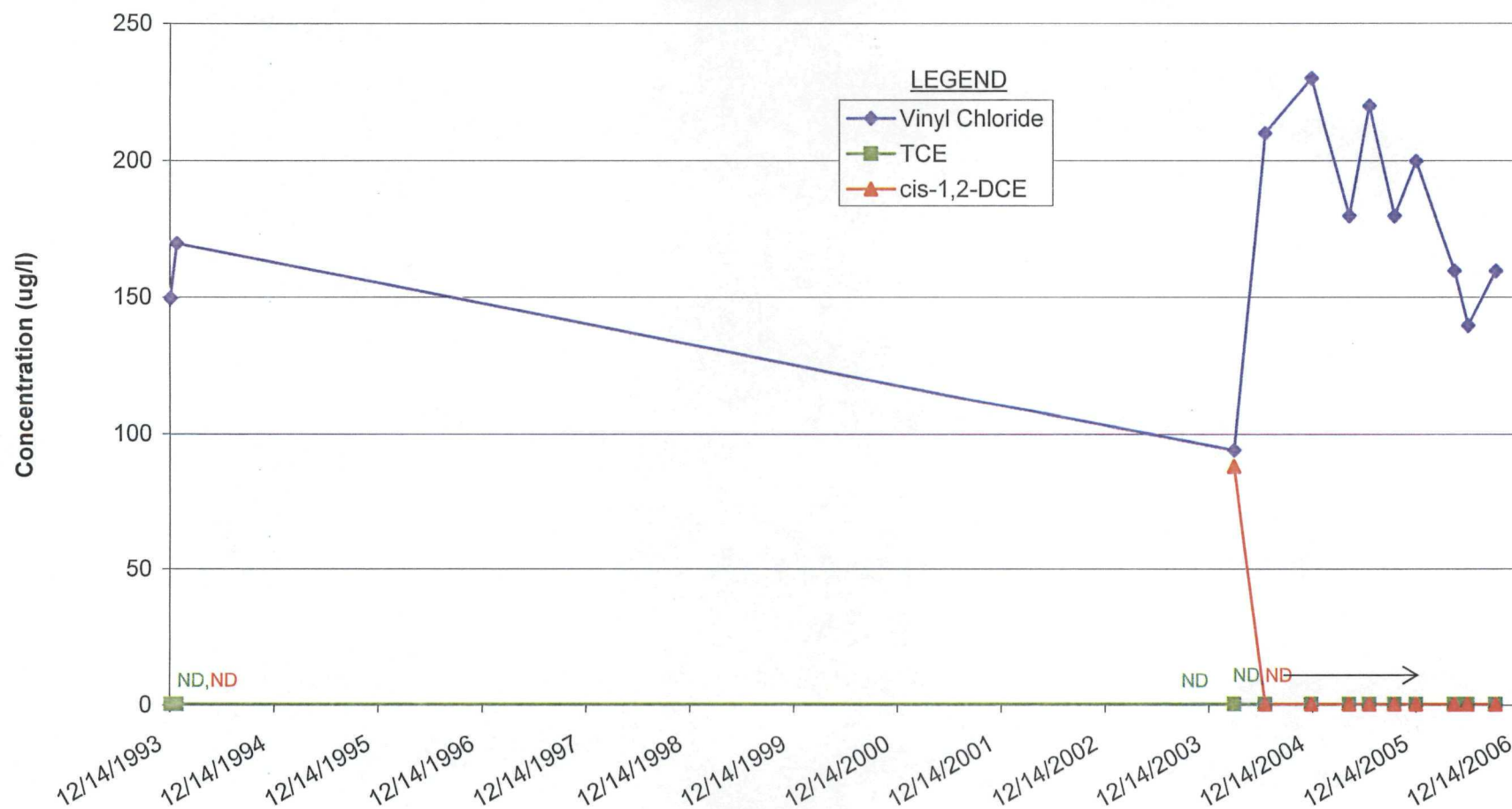




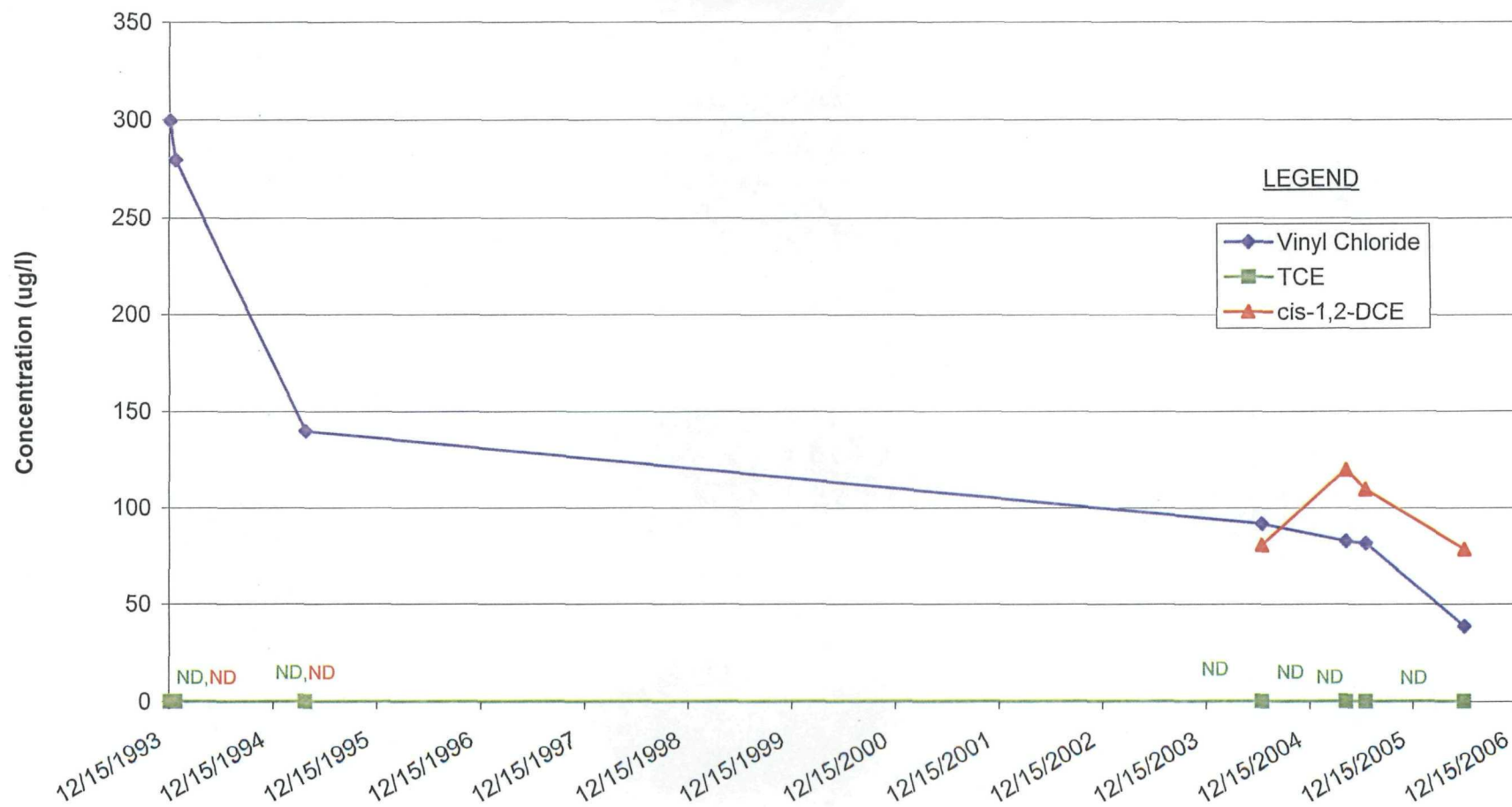
**FIGURE 7**  
**DNR-7**  
**VC, Tce, and cis-1,2-DCE Concentrations Over Time**  
**June 2006 Annual Monitoring Event**  
**Rose Township Site**  
**Holly, Michigan**



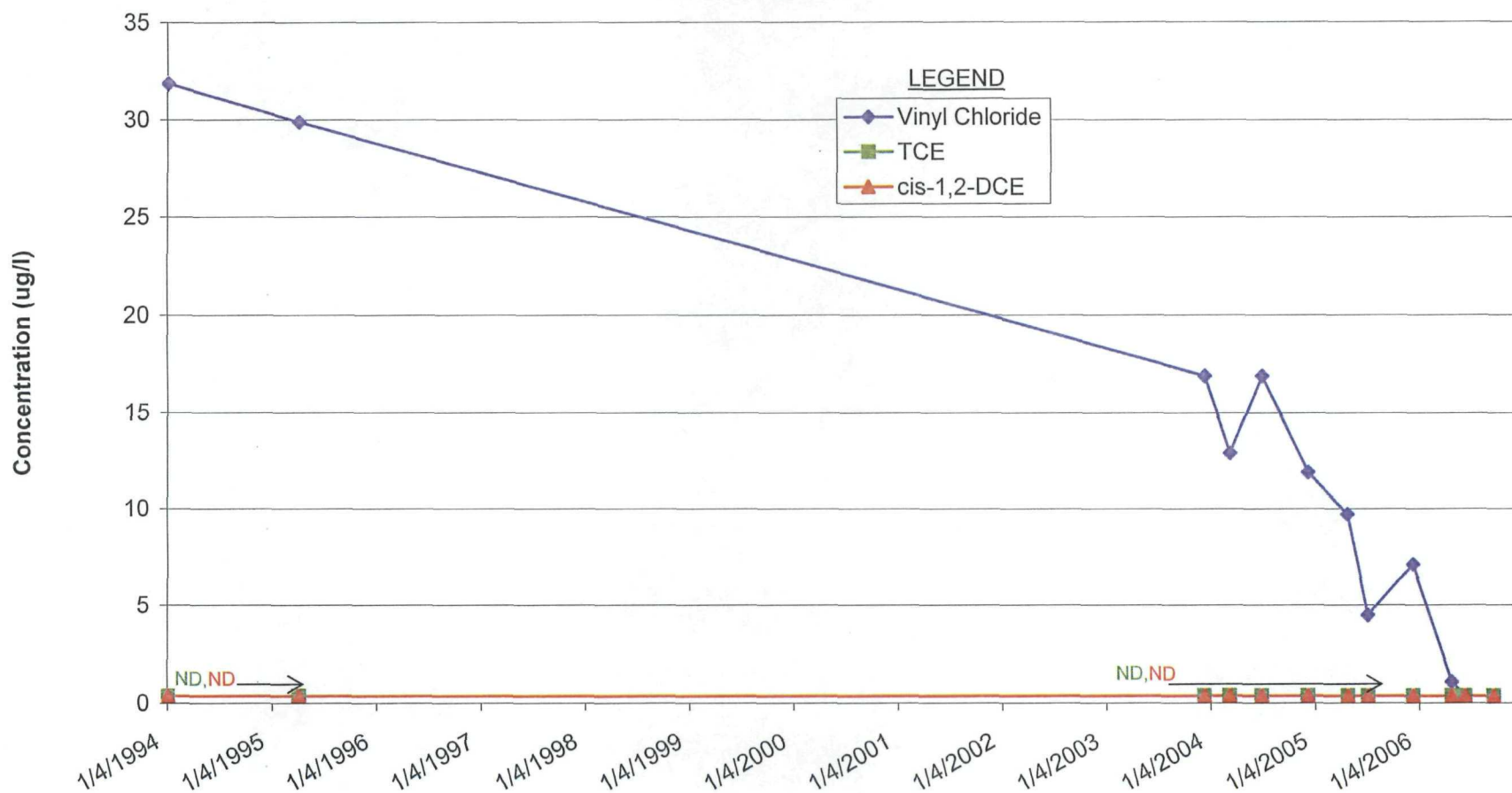
**FIGURE 8**  
**GW-5I**  
**VC, TCE, and cis-1,2-DCE Concentrations Over Time**  
**June 2006 Annual Monitoring Event**  
**Rose Township Site**  
**Holly, Michigan**



**FIGURE 9**  
**GW-5D**  
**VC, TCE, and cis-1,2-DCE Concentrations Over Time**  
**June 2006 Annual Monitoring Event**  
**Rose Township Site**  
**Holly, Michigan**

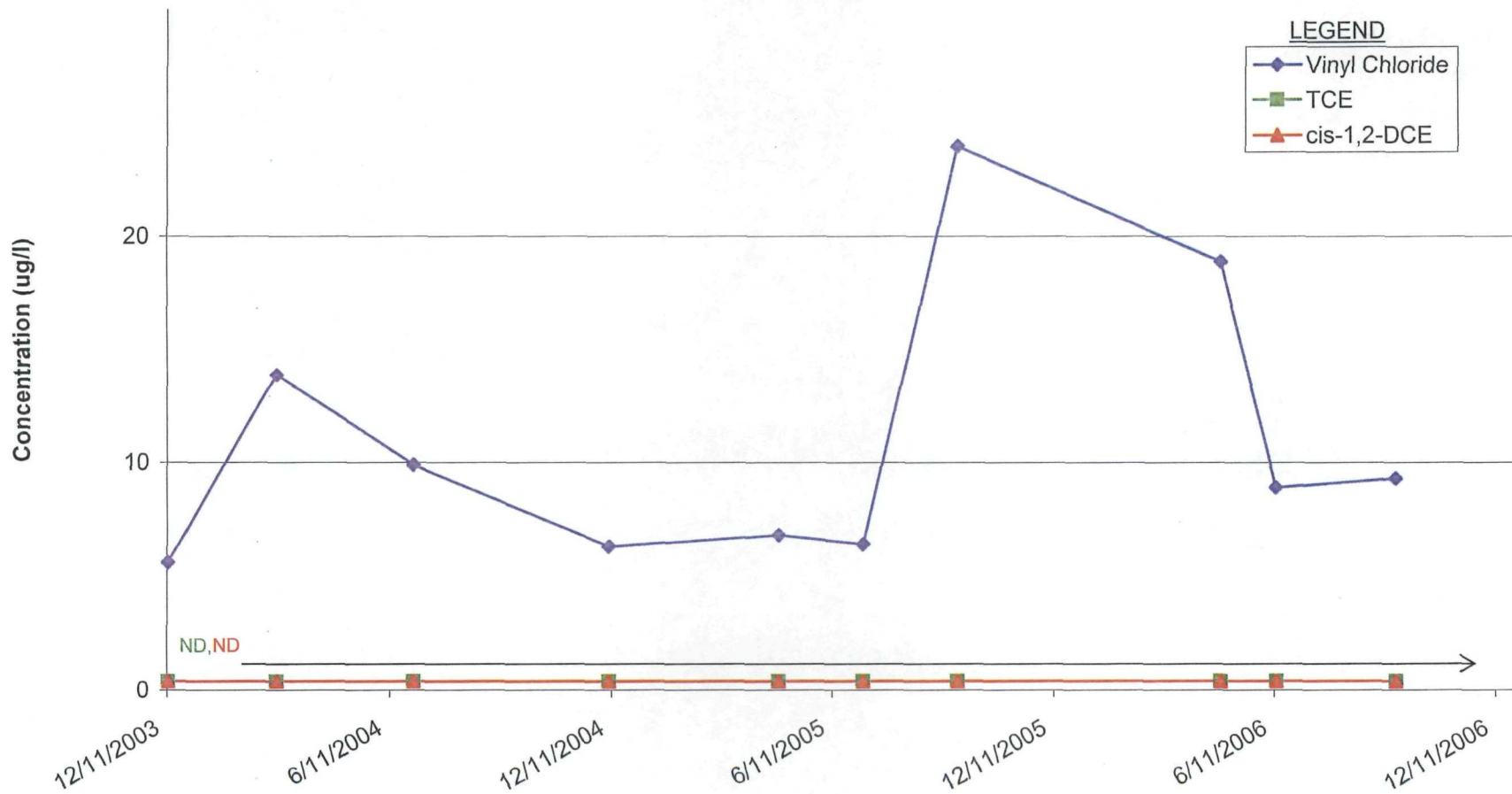


**FIGURE 10**  
**GW-6D**  
**VC, Tce, and cis-1,2-DCE Concentrations Over Time**  
**June 2006 Annual Monitoring Event**  
**Rose Township Site**  
**Holly, Michigan**





**FIGURE 11**  
**GW-17I**  
**VC, TCE, and cis-1,2-DCE Concentrations Over Time**  
**June 2006 Annual Monitoring Event**  
**Rose Township Site**  
**Holly, Michigan**



**FIGURE 12**  
**GW-17D**  
**VC, TCE, and cis-1,2-DCE Concentrations Over Time**  
**June 2006 Annual Monitoring Event**  
**Rose Township Site**  
**Holly, Michigan**

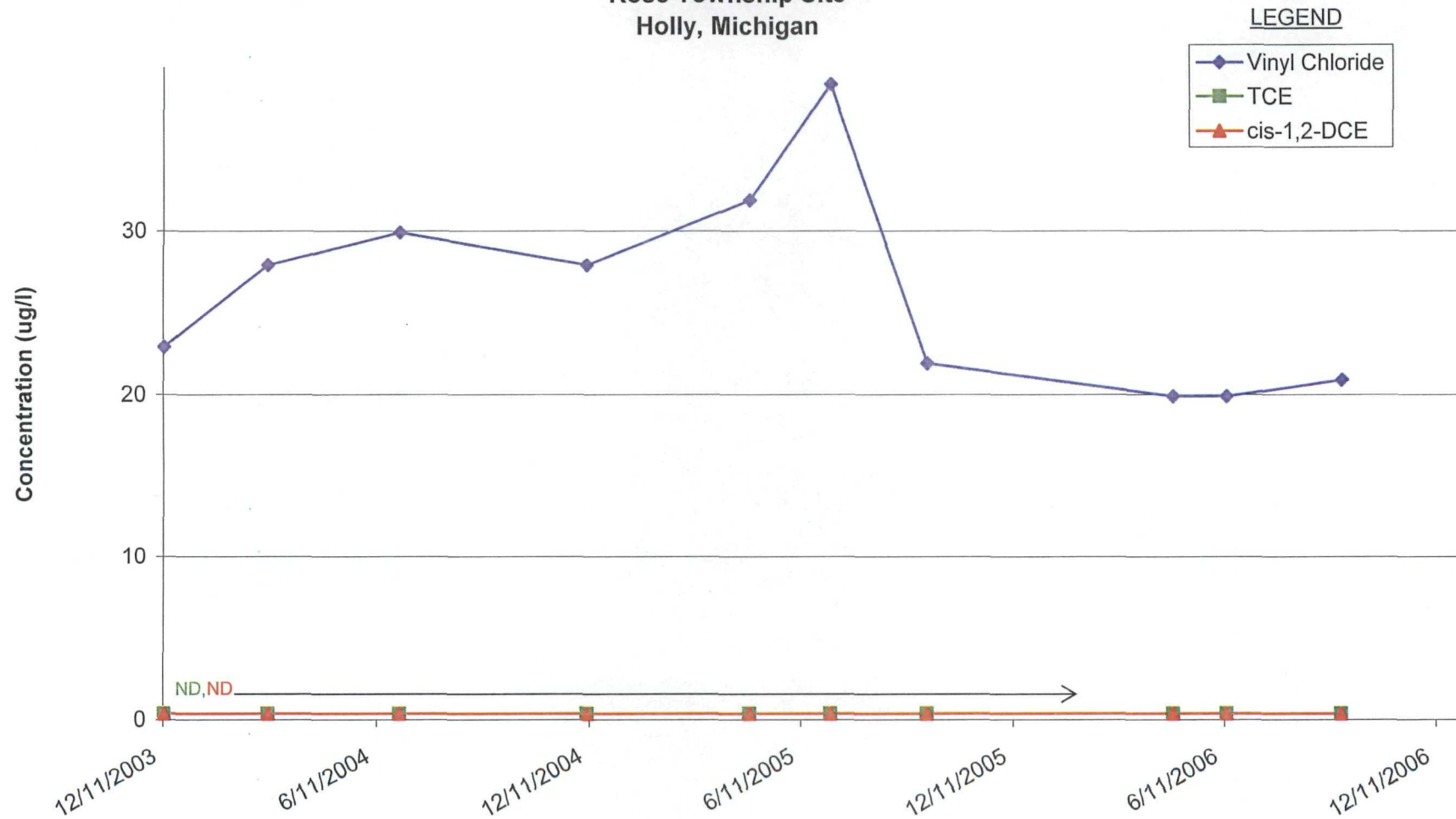
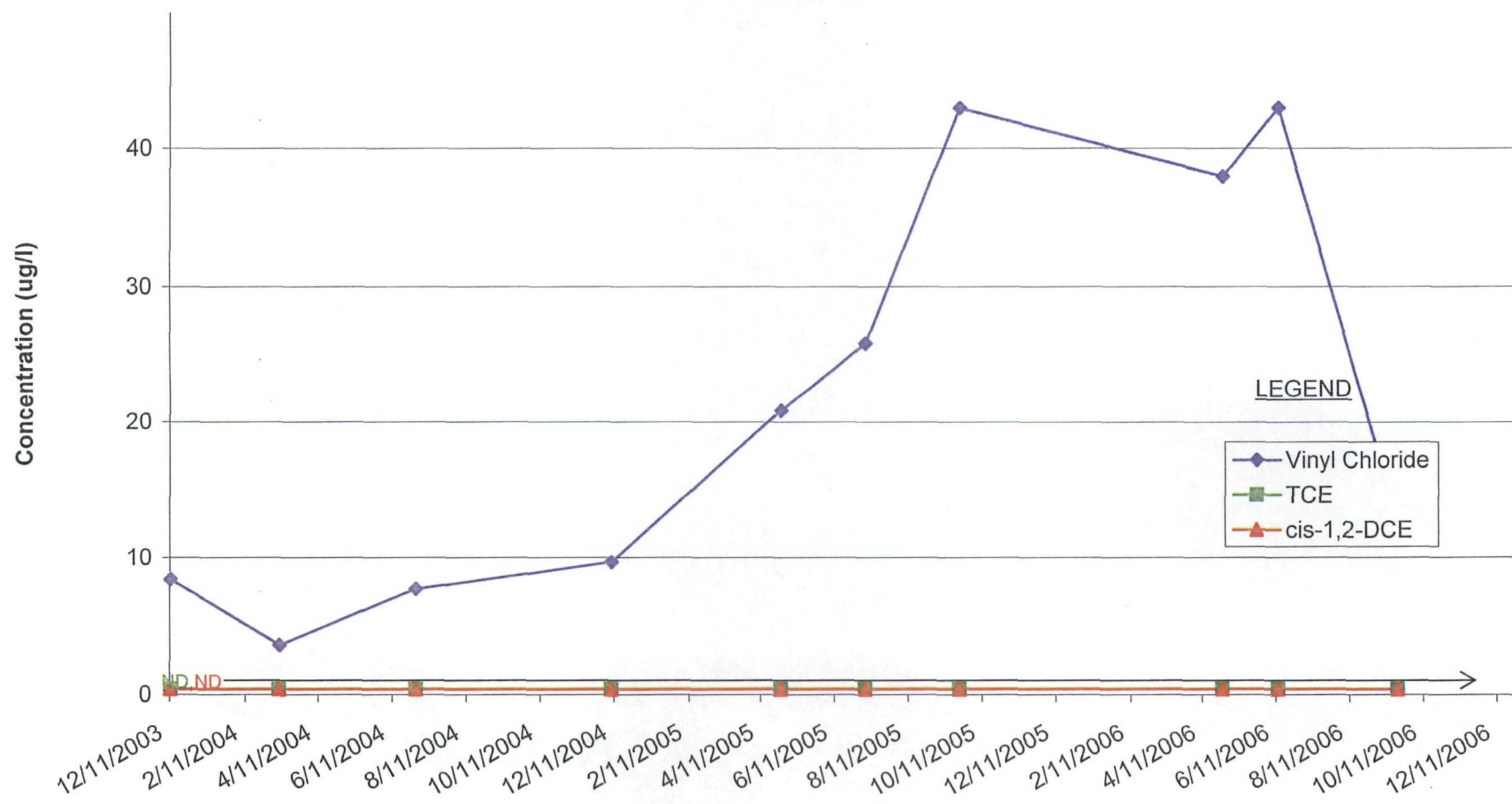
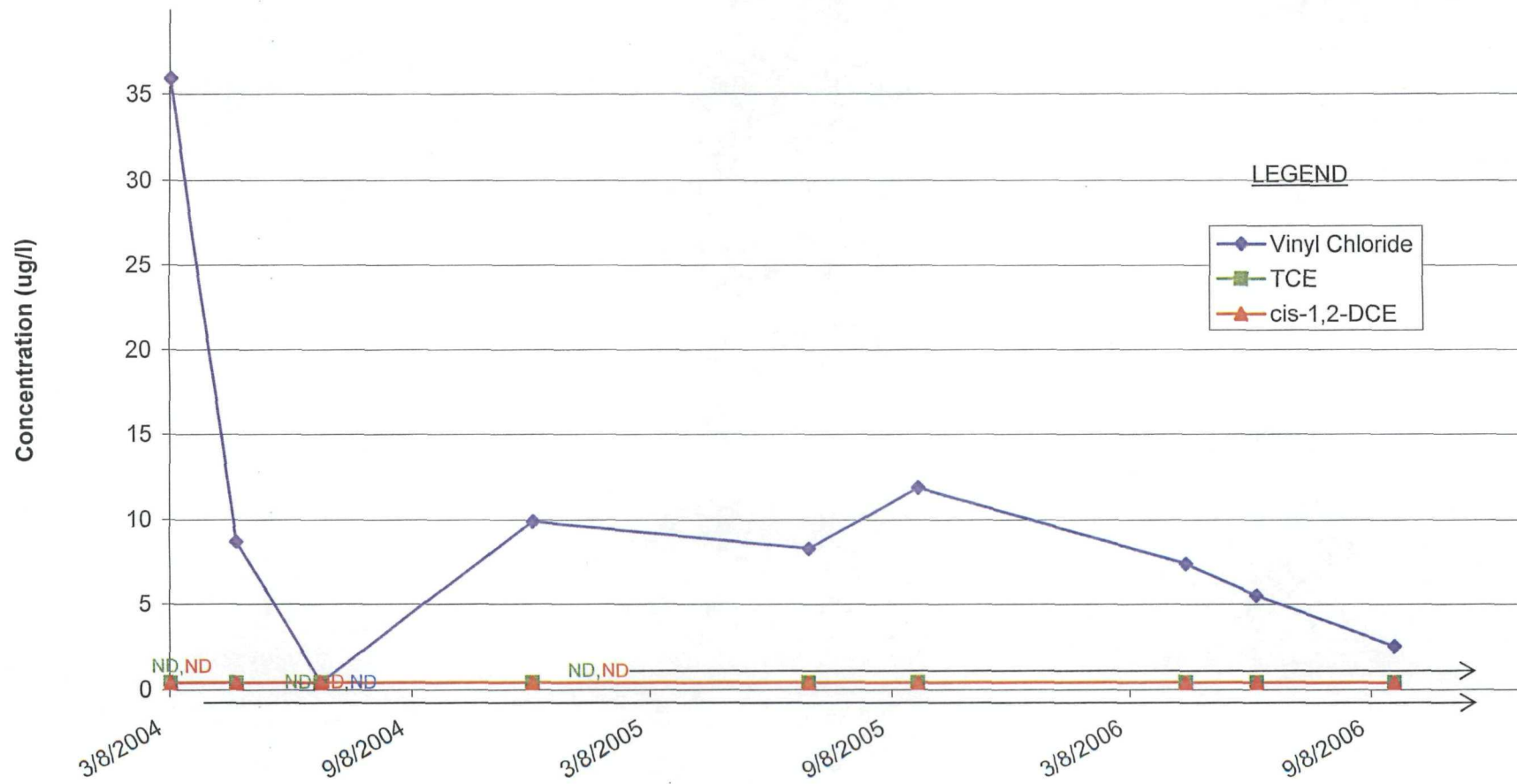


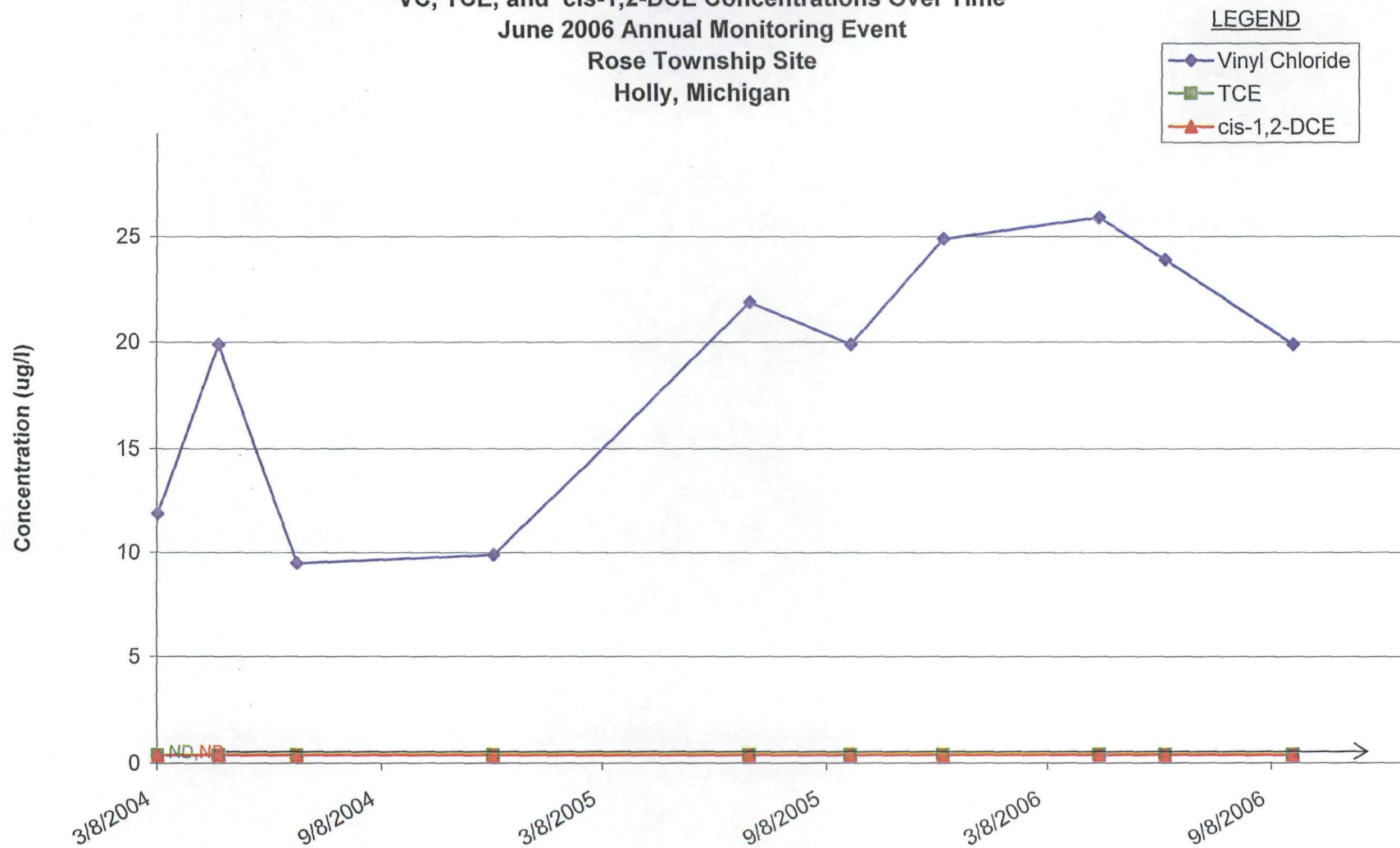
FIGURE 13  
GW-18  
VC, TCE, and cis-1,2-DCE Concentrations Over Time  
June 2006 Annual Monitoring Event  
Rose Township Site  
Holly, Michigan



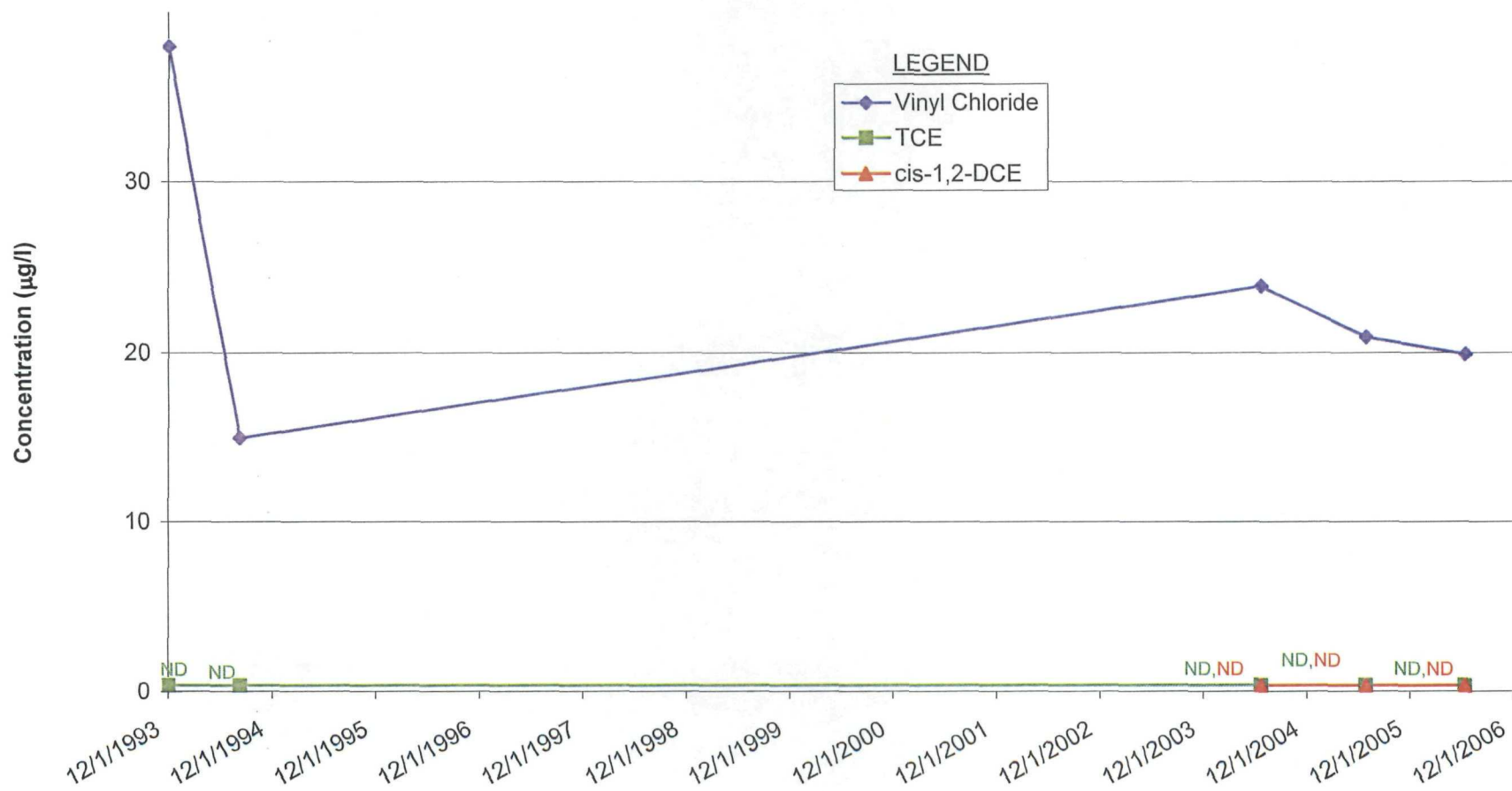
**FIGURE 14**  
**GW-19S**  
**VC, TCE, and cis-1,2-DCE Concentrations Over Time**  
**June 2006 Annual Monitoring Event**  
**Rose Township Site**  
**Holly, Michigan**



**FIGURE 15**  
**GW-20D**  
**VC, TCE, and cis-1,2-DCE Concentrations Over Time**  
**June 2006 Annual Monitoring Event**  
**Rose Township Site**  
**Holly, Michigan**

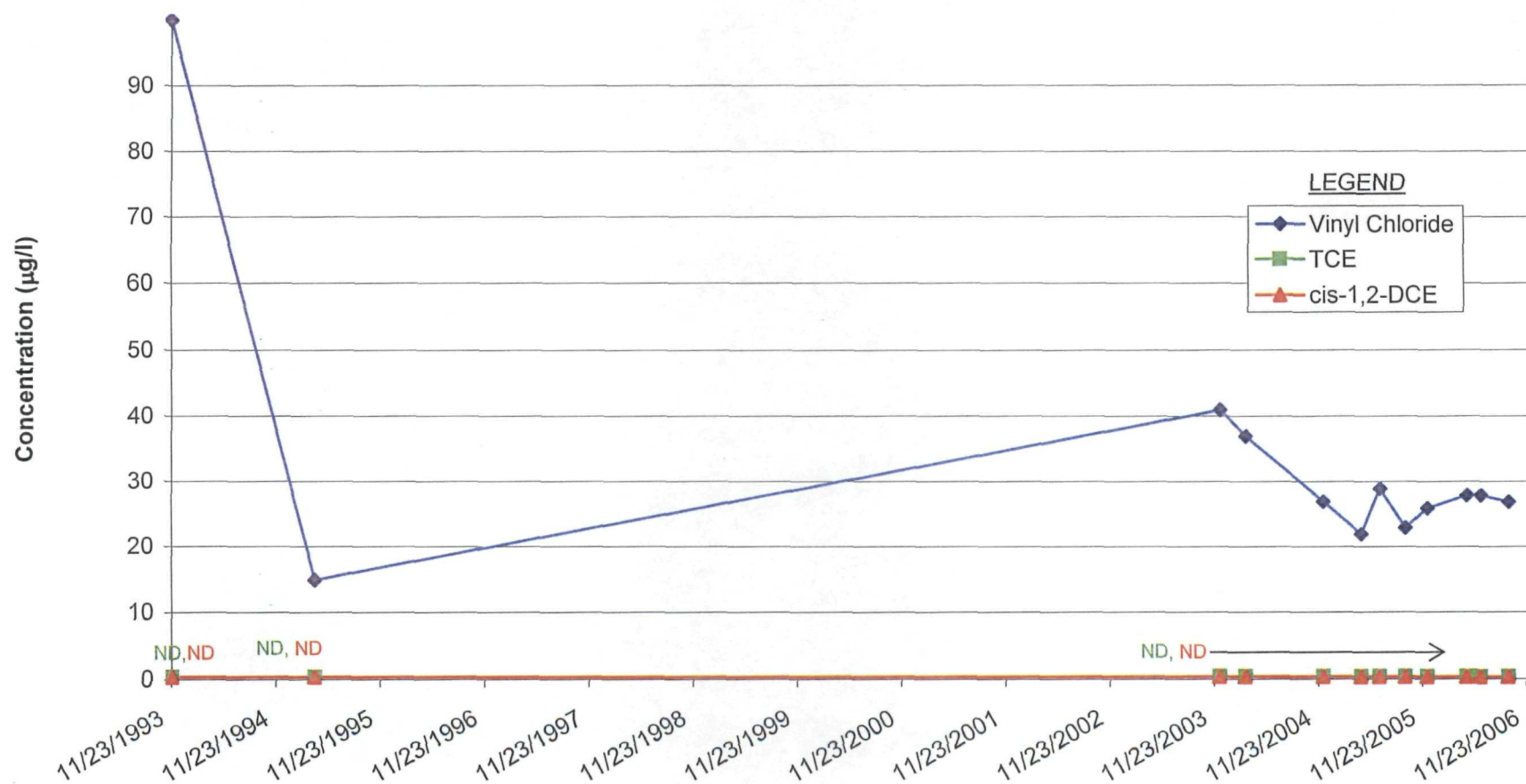


**FIGURE 16**  
**MW-2I**  
**VC, TCE, and cis-1,2-DCE Concentrations Over Time**  
**June 2006 Annual Monitoring Event**  
**Rose Township Site**  
**Holly, Michigan**

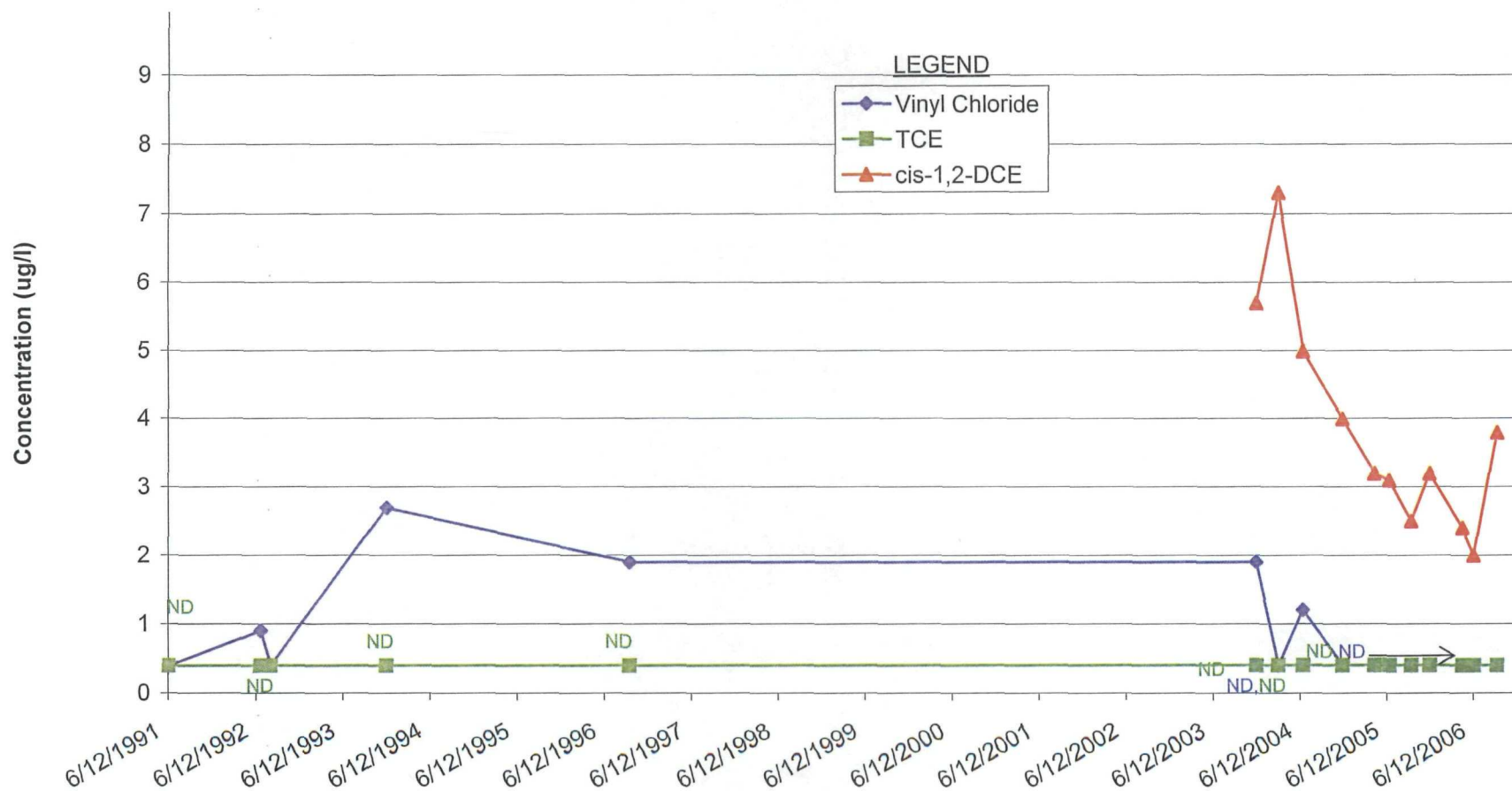




**FIGURE 17**  
**MW-3I**  
**VC, Tce, and cis-1,2-DCE Concentrations Over Time**  
**June 2006 Annual Monitoring Event**  
**Rose Township Site**  
**Holly, Michigan**



**FIGURE 18**  
**MW-103S**  
**VC, TCE, and cis-1,2-DCE Concentrations Over Time**  
**June 2006 Annual Monitoring Event**  
**Rose Township Site**  
**Holly, Michigan**





**FIGURE 19**  
**RW-1D**  
**VC, TCE, and cis-1,2-DCE Concentrations Over Time**  
**June 2006 Annual Monitoring Event**  
**Rose Township Site**  
**Holly, Michigan**

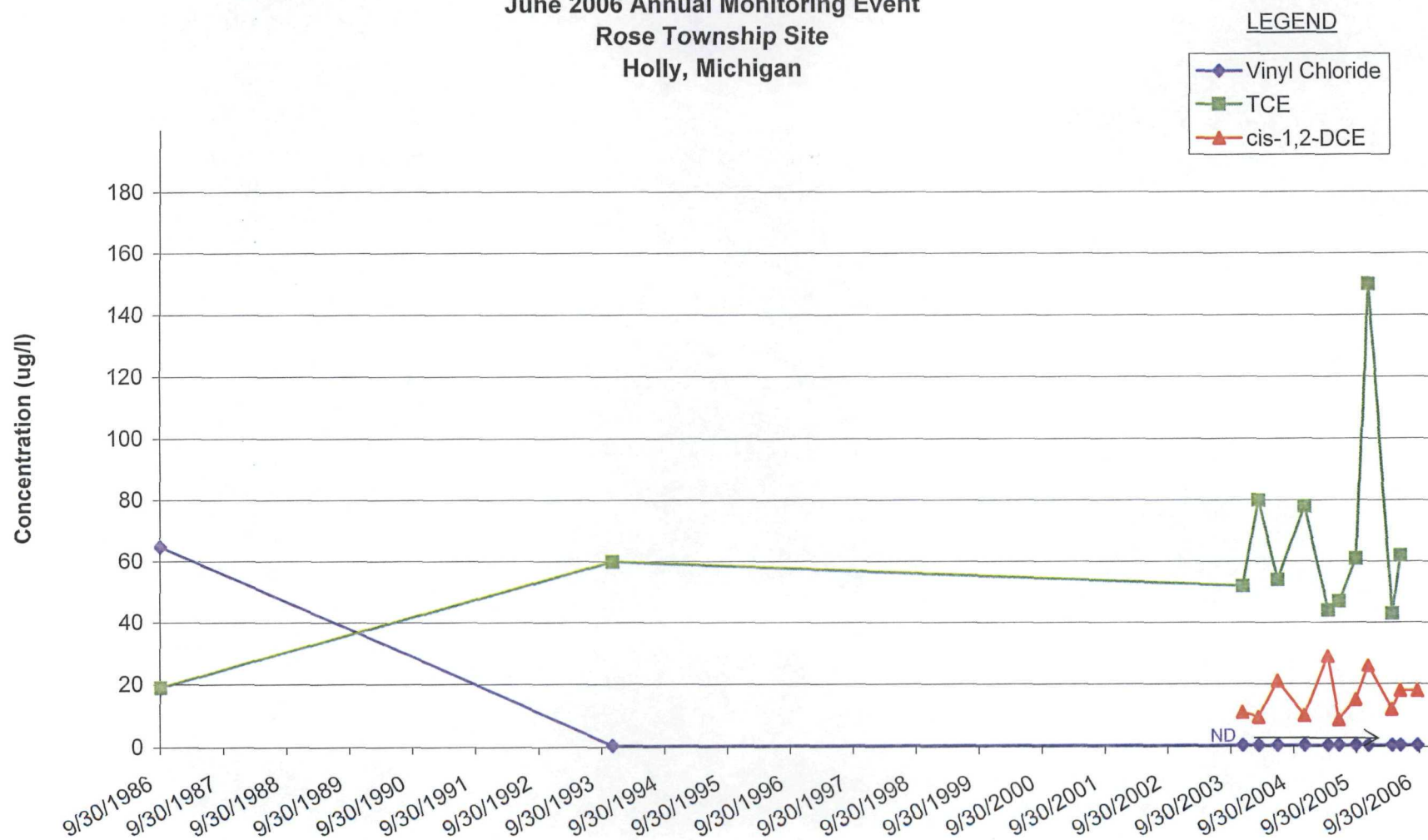
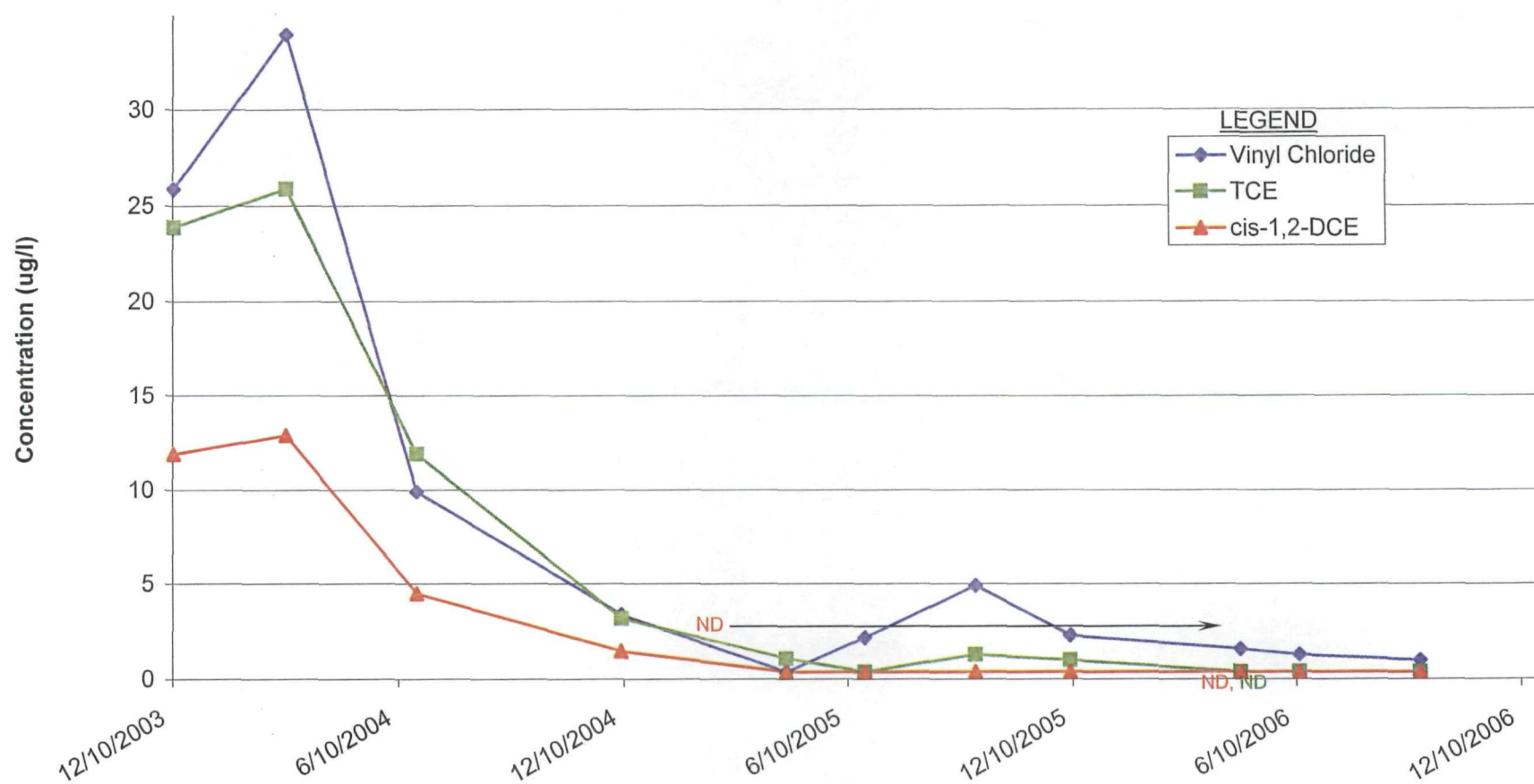
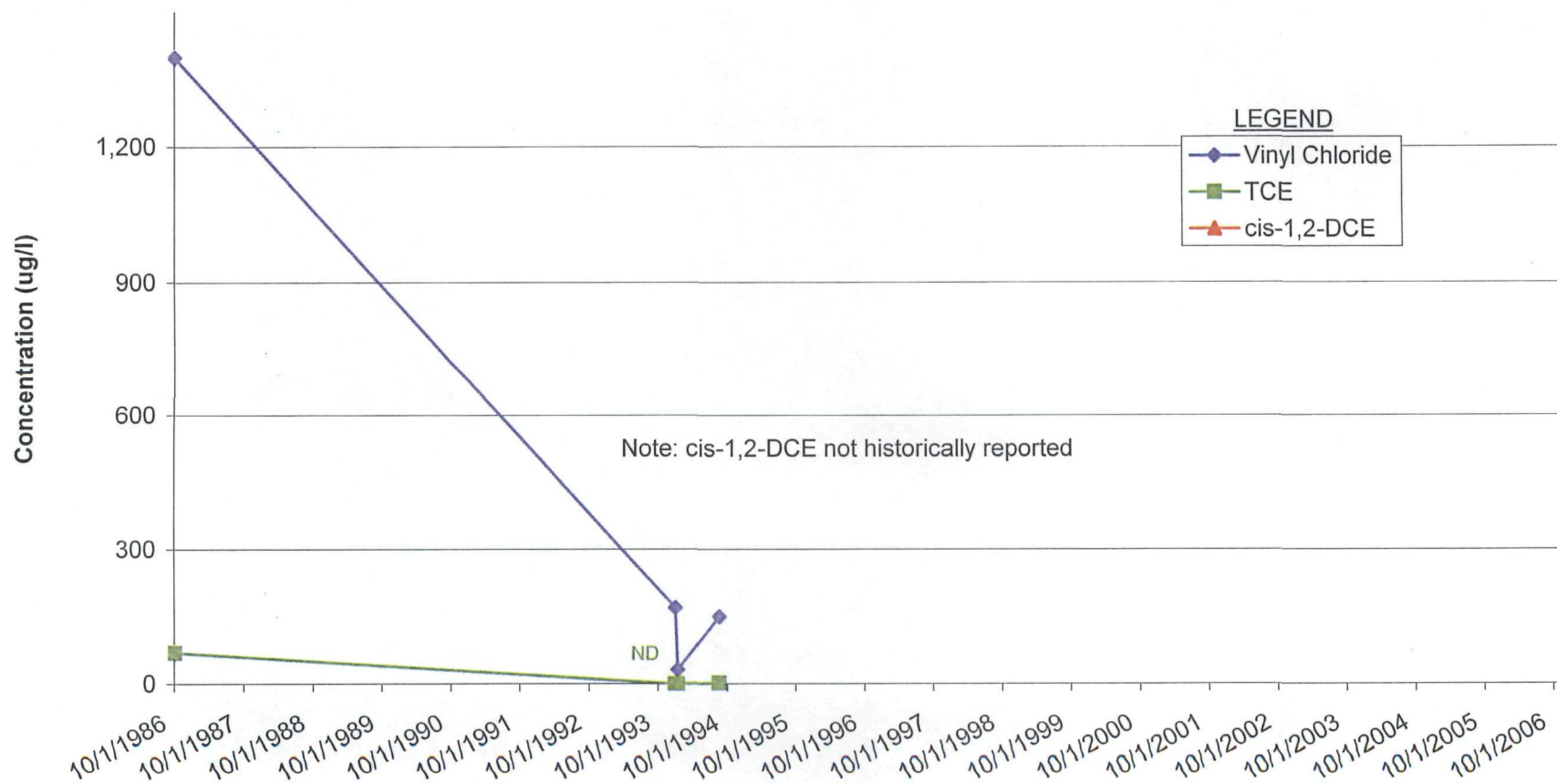


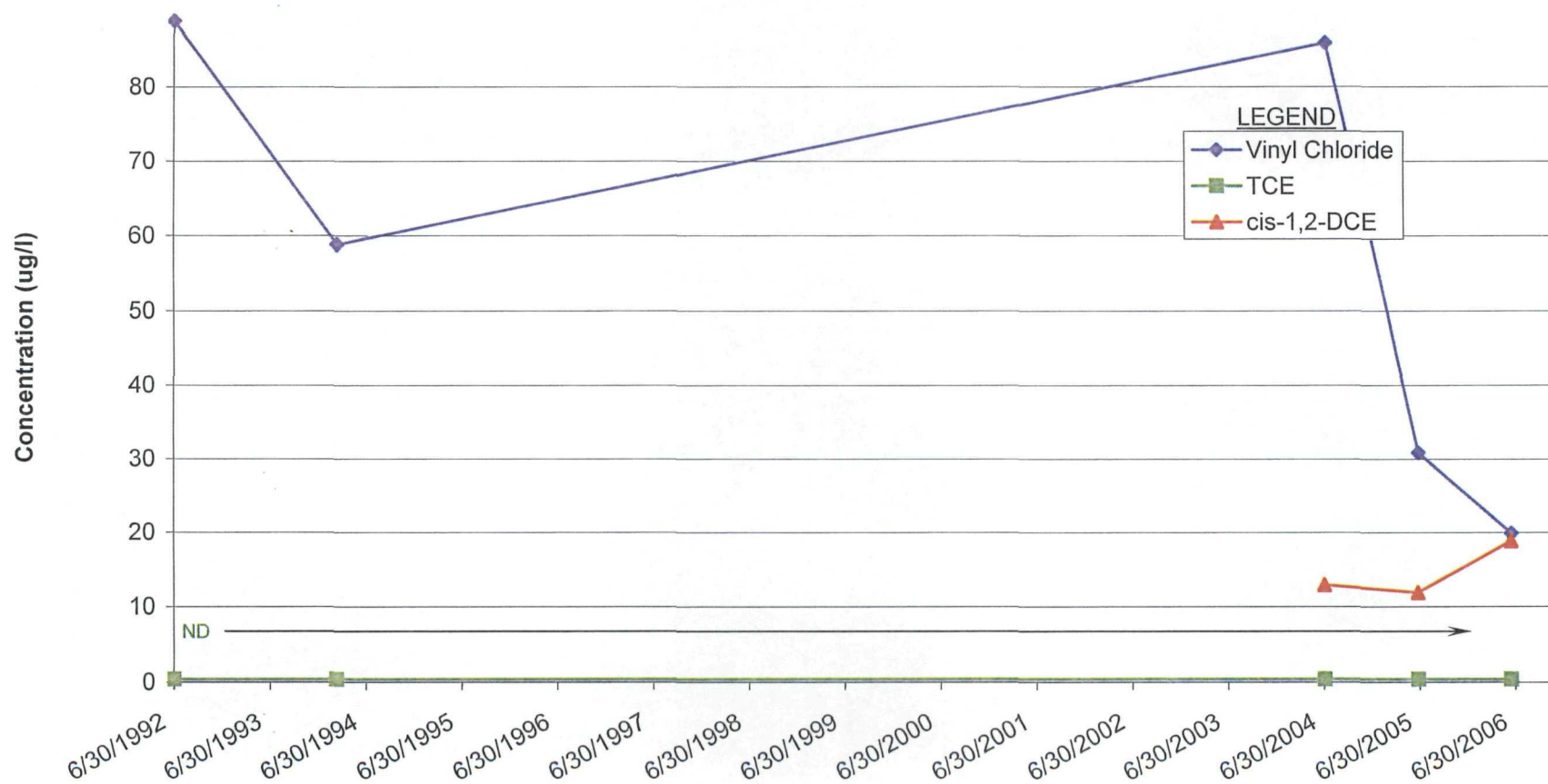
FIGURE 20  
RW-5S  
VC, TCE, and cis-1,2-DCE Concentrations Over Time  
June 2006 Annual Monitoring Event  
Rose Township Site  
Holly, Michigan



**FIGURE 21**  
**RW-5D**  
**VC, TCE, and cis-1,2-DCE Concentrations Over Time**  
**June 2006 Annual Monitoring Event**  
**Rose Township Site**  
**Holly, Michigan**



**FIGURE 22**  
**PW-1**  
**VC, TCE and cis-1,2-DCE Concentrations Over Time**  
**June 2006 Annual Monitoring Event**  
**Rose Township Site**  
**Holly, Michigan**



**FIGURE 23**  
**PW-3**  
**VC, TCE, and cis-1,2-DCE Concentrations Over Time**  
**June 2006 Annual Monitoring Event**  
**Rose Township Site**  
**Holly, Michigan**

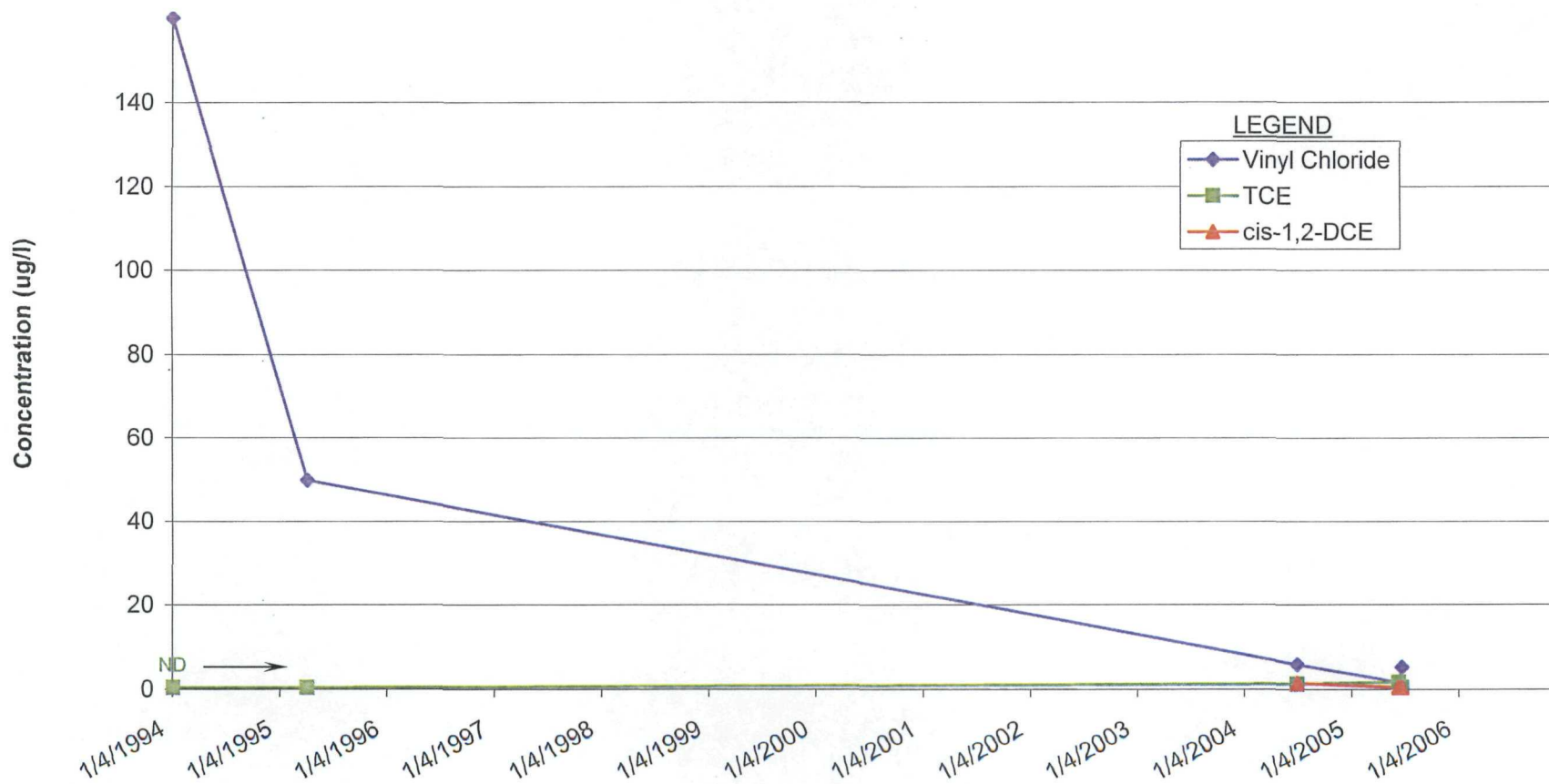
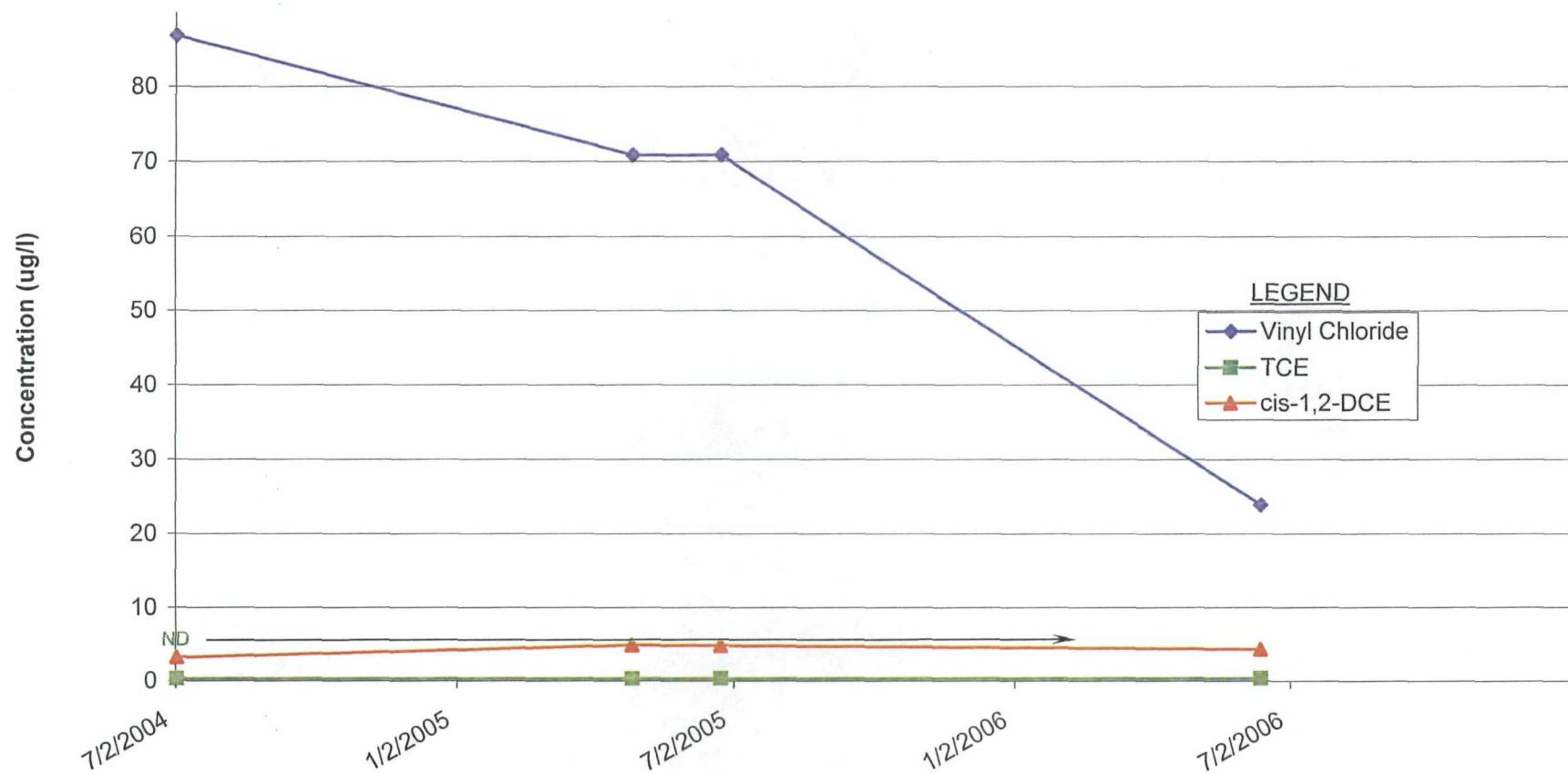
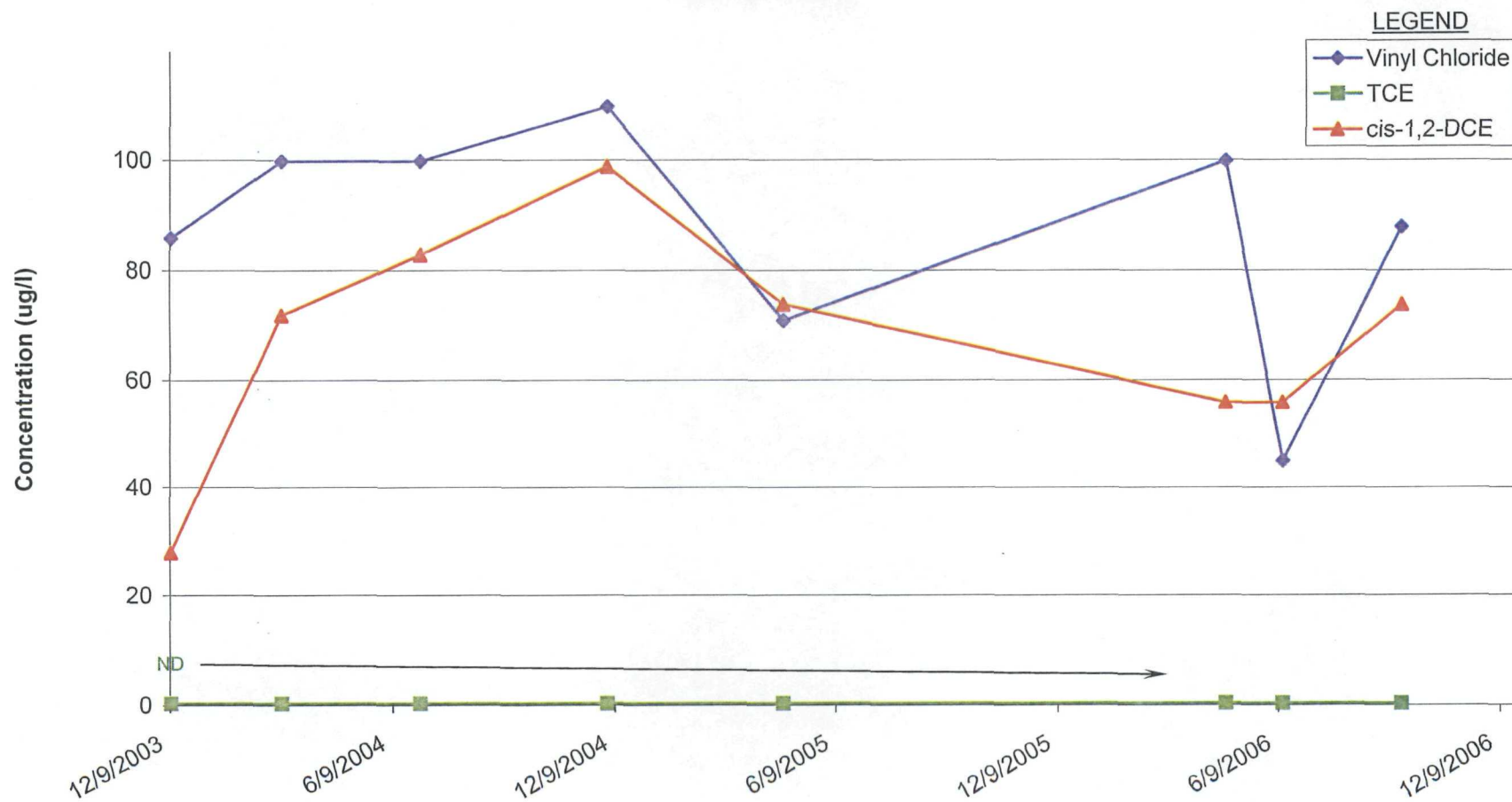


FIGURE 24  
PW-6  
VC, TCE, and cis-1,2-DCE Concentrations Over Time  
June 2006 Annual Monitoring Event  
Rose Township Site  
Holly, Michigan

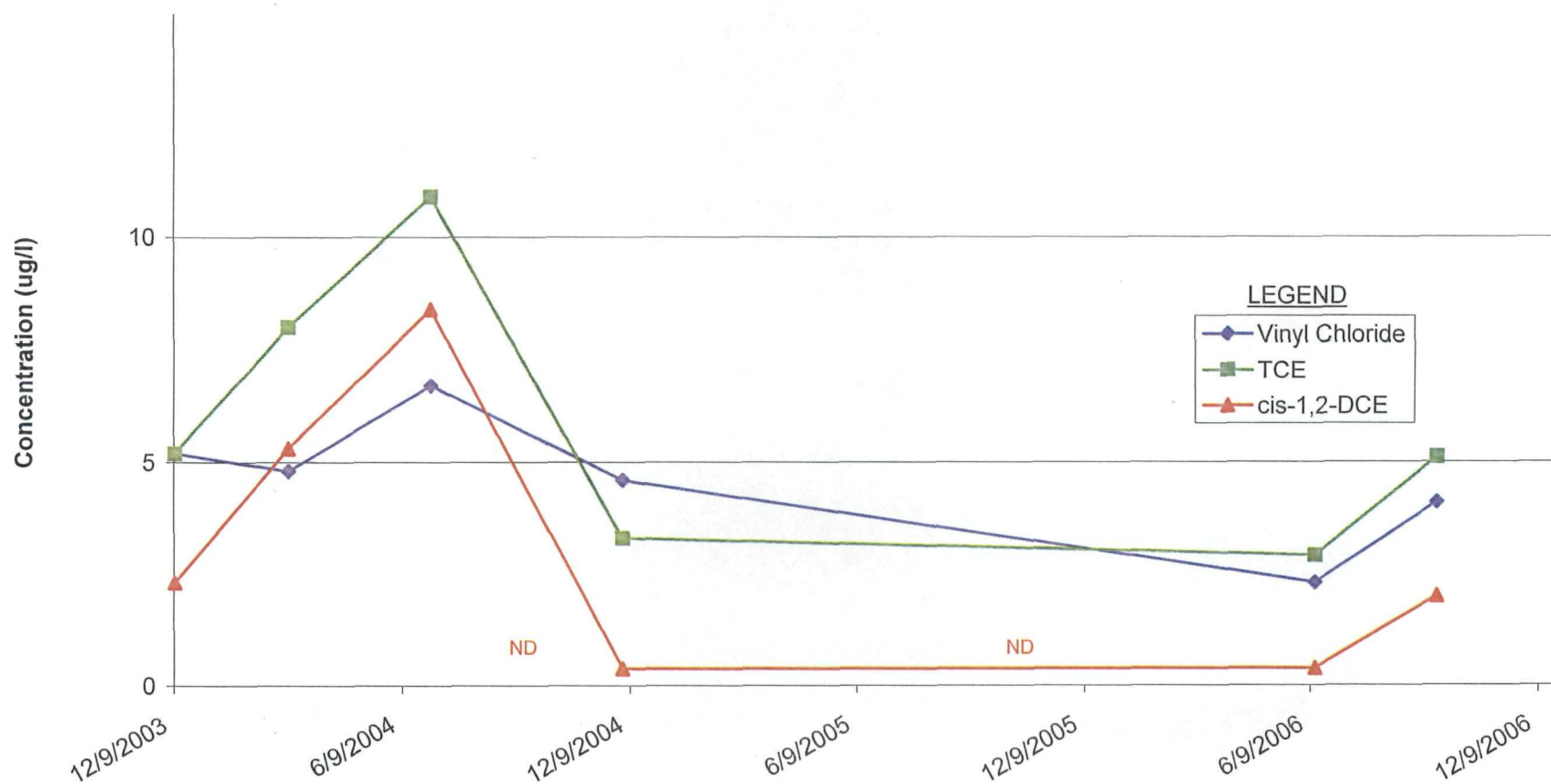




**FIGURE 25**  
**PW-7**  
**VC, TCE, and cis-1,2-DCE Concentrations Over Time**  
**June 2006 Annual Monitoring Event**  
**Rose Township Site**  
**Holly, Michigan**



**FIGURE 26**  
**PW-8**  
**VC, TCE, and cis-1,2-DCE Concentrations Over Time**  
**June 2006 Annual Monitoring Event**  
**Rose Township Site**  
**Holly, Michigan**







## Tables

Table 1  
Summary of Groundwater Level Elevations  
September 22, 2006  
Rose Township Demode Road Site  
Holly, Michigan

Well ID	Northing	Easting	op of Casin Elevation	Ground Surface	Ground Surface Elevation	Screened Interval			Screened Interval			Total Depth	Total Depth	Flowing Well	September-06	
						Screen Minimum Depth	Screen Maximum Depth	Screen Length	Screen Minimum Depth	Screen Maximum Depth	Water Level				Head Elevation	
																(ft. AMSL)
			(ft. AMSL)	(ft. BTOC)	(ft. AMSL)	(ft. BGS)	(ft. BGS)	(feet)	(ft. AMSL)	(ft. AMSL)	(ft. BGS)	(ft. AMSL)			(ft. ATOC)	(ft. AMSL)
DNR-1	444677.19	13319929.47	1000.65	-3.35	1004.00	51.0	53.0	2.0	953.0	951.0	53.0	951.0	Yes		2.02	1002.67
DNR-2	444939.57	13319748.06	997.33	-3.27	1000.60	93.0	95.0	2.0	907.6	905.6	95.0	905.6	Yes		5.53	1002.86
DNR-3	445688.24	13320139.49	996.92	-5.48	1002.40	82.0	84.0	2.0	920.4	918.4	84.0	918.4	Yes		NM	
DNR-4S	447532.39	13320808.49	981.20	2.50	978.70	48.0	53.0	5.0	930.7	925.7	53.0	925.7	Yes		12.88	994.08
DNR-4I	447532.60	13320802.39	981.33	2.00	979.33	79.0	84.0	5.0	900.3	895.3	84.0	895.3	Yes		12.88	994.21
DNR-4D	447539.01	13320810.89	978.50	-0.60	979.10	116.0	118.0	2.0	863.1	861.1	118.0	861.1	Yes		15.92	994.42
DNR-5	446988.03	13320380.71	998.14	-3.56	1001.70	97.0	99.0	2.0	904.7	902.7	99.0	902.7	Yes		-0.65	997.49
DNR-6	446826.83	13320695.53	996.58	4.02	992.56	68.0	70.0	2.0	924.6	922.6	70.0	922.6	Yes		-49.49	947.09
DNR-7	446708.57	13320500.96	1031.85	-0.35	1032.20	79.0	81.0	2.0	953.2	951.2	81.0	951.2	No		-34.59	997.26
GW-1S	447405.64	13320473.72	980.33	2.63	977.70	NA	NA	NA	NA	NA	NA	NA	Yes		13.27	993.60
GW-1I	447402.39	13320468.56	979.91	3.00	976.91	91.0	96.0	5.0	885.9	880.9	96.0	880.9	Yes		13.35	993.26
GW-1D	447416.34	13320470.01	980.48	2.75	977.73	122.0	127.0	5.0	855.7	850.7	127.0	850.7	Yes		15.99	996.47
GW-2	446973.75	13320794.04	981.34	3.00	978.34	40.5	45.5	5.0	937.8	932.8	45.5	932.8	Yes		9.25	990.59
GW-3S	446734.78	13320830.55	990.87	3.00	987.87	62.0	67.0	5.0	925.9	920.9	67.0	920.9	Yes		5.74	996.61
GW-3I	446734.78	13320830.55	991.13	2.50	988.63	79.5	84.5	5.0	909.1	904.1	84.5	904.1	Yes		6.12	997.25
GW-3D	446734.78	13320830.55	990.60	2.00	988.60	98.0	103.0	5.0	890.6	885.6	103.0	885.6	Yes		5.74	996.34
GW-4S	447577.63	13321047.35	978.23	2.67	975.56	58.0	63.0	5.0	917.6	912.6	63.0	912.6	Yes		11.60	989.83
GW-4I	447574.64	13321040.42	977.35	2.75	974.60	85.0	90.0	5.0	889.6	884.6	90.0	884.6	Yes		16.21	993.56
GW-4D	447574.24	13321030.39	977.27	2.67	974.60	109.0	114.0	5.0	865.6	860.6	114.0	860.6	Yes		16.40	993.67
GW-5S	446928.46	13320739.18	983.89	1.50	982.39	52.0	57.0	5.0	930.4	925.4	57.0	925.4	Yes		9.40	993.29
GW-5I	446933.48	13320734.62	984.53	1.96	982.57	70.0	75.0	5.0	912.6	907.6	75.0	907.6	Yes		9.68	994.21
GW-5D	446932.99	13320740.73	984.66	2.38	982.28	90.5	95.5	5.0	891.8	886.8	95.5	886.8	Yes		9.57	994.23
GW-6S	447038.22	13320589.52	982.42	1.42	981.00	54.0	59.0	5.0	927.0	922.0	59.0	922.0	Yes		NM ^	
GW-6I	447048.80	13320585.72	982.43	2.54	979.89	73.0	78.0	5.0	906.9	901.9	78.0	901.9	Yes		5.96	988.39
GW-6D	447043.97	13320590.86	982.09	2.25	979.84	92.0	97.0	5.0	887.8	882.8	97.0	882.8	Yes		13.47	995.56
GW-7S	446806.97	13320309.59	1025.20	2.88	1022.32	24.0	29.0	5.0	998.3	993.3	29.0	993.3	No		-25.70	999.50
GW-7I	446802.93	13320309.59	1025.24	2.29	1022.95	69.5	74.5	5.0	953.5	948.5	74.5	948.5	No		-27.64	997.60
GW-8S	446703.98	13320502.98	1031.99	2.33	1029.66	36.0	41.0	5.0	993.7	988.7	41.0	988.7	No		-33.95	998.04
GW-9S	446379.76	13320544.39	1038.33	2.42	1035.91	35.5	40.5	5.0	1000.4	995.4	40.5	995.4	No		-37.63	1000.70
GW-10S	447114.18	13320396.37	989.70	2.46	987.24	75.0	80.0	5.0	912.2	907.2	80.0	907.2	Yes		3.37	993.07
GW-10I	447122.52	13320399.72	989.58	2.71	986.87	98.0	103.0	5.0	888.9	883.9	103.0	883.9	Yes		6.80	996.38
GW-10D	447119.94	13320403.80	989.50	2.83	986.67	120.0	125.0	5.0	866.7	861.7	125.0	861.7	Yes		7.44	996.94
GW-11S	446409.53	13320733.82	1030.19	2.50	1027.69	46.5	51.5	5.0	981.2	976.2	51.5	976.2	No		-31.86	998.33
GW-11I	446402.35	13320728.06	1030.29	2.46	1027.83	135.0	140.0	5.0	892.8	887.8	140.0	887.8	No		-31.10	999.19
GW-11D	446404.83	13320734.18	1030.05	2.54	1027.51	183.0	188.0	5.0	844.5	839.5	188.0	839.5	No		-26.12	1003.93
GW-12S	446013.89	13320755.24	1031.12	2.83	1028.29	65.5	70.5	5.0	962.8	957.8	70.5	957.8	No		-30.95	1000.17
GW-12I	445997.47	13320748.12	1030.52	2.88	1027.64	138.0	143.0	5.0	889.6	884.6	143.0	884.6	No		-30.12	1000.40
GW-12D	446004.63	13320753.73	1031.01	2.88	1028.13	191.0	196.0	5.0	837.1	832.1	196.0	832.1	No		-27.01	1004.00
GW-13S	446998.74	13320264.22	1009.84	2.88	1006.96	75.0	80.0	5.0	932.0	927.0	80.0	927.0	No		-13.44	996.40
GW-13I	446997.63	13320254.84	1010.12	3.13	1006.99	92.0	97.0	5.0	915.0	910.0	102.0	905.0	No		-12.41	997.71
GW-13D	446996.88	13320273.21	1009.60	2.88	1006.72	120.0	125.0	5.0	886.7	881.7	140.0	866.7	No		-11.95	997.65
GW-14	447085.90	13320445.08	990.08	3.21	986.87	176.0	181.0	5.0	810.9	805.9	240.0	746.9	Yes		7.27	997.35
GW-15	447219.87	13320274.36	985.85	2.54	983.31	98.0	103.0	5.0	885.3	880.3	103.0	880.3	Yes		2.90	988.75
GW-16	444967.05	</														

Table 1  
Summary of Groundwater Level Elevations  
September 22, 2006  
Rose Township Demode Road Site  
Holly, Michigan

Well ID	Northing	Easting	Top of Casing Elevation (ft. AMSL)	Ground Surface (ft. BTOC)	Ground Surface Elevation (ft. AMSL)	Screened Interval		Screen Length  (feet)	Screened Interval		Total Depth  (ft. BGS)	Total Depth  (ft. AMSL)	Flowing Well	September-06	
						Screen Minimum Depth (ft. BGS)	Screen Maximum Depth (ft. BGS)		Screen Minimum Depth (ft. AMSL)	Screen Maximum Depth (ft. AMSL)				Water Level Measurement (ft. ATOC)	Head Elevation (ft. AMSL)
RW-6	444915.45	13320450.88	1026.42	2.83	1023.59	31.0	34.0	3.0	992.6	989.6	34.0	989.6	No		NM
RW-6D	444915.45	13320450.88	1026.98	3.50	1023.48	66.0	69.0	3.0	957.5	954.5	69.0	954.5	No	-25.50	1001.48
RW-7	445120.68	13320242.82	1022.74	2.63	1020.11	13.5	18.5	5.0	1006.6	1001.6	18.5	1001.6	No		Dry
RW-8	445233.79	13320192.70	1023.06	2.75	1020.31	37.0	40.0	3.0	983.3	980.3	40.0	980.3	No	-21.88	1001.18
RW-8D	445237.45	13320191.79	1022.20	1.75	1020.45	70.0	73.0	3.0	950.5	947.5	73.0	947.5	No	-21.00	1001.20
RW-9	445309.05	13319941.89	999.99	2.92	997.07	11.0	14.0	3.0	986.1	983.1	14.0	983.1	No	-8.26	991.73
RW-10	445809.13	13320706.46	1023.13	3.21	1019.92	15.0	18.0	3.0	1004.9	1001.9	18.0	1001.9	No	-11.88	1011.25
RW-11	446529.54	13320346.67	1035.04	3.04	1032.00	33.0	36.0	3.0	999.0	996.0	36.0	996.0	No		NM
RW-12	444963.45	13320929.00	1046.84	2.83	1044.01	44.0	47.0	3.0	1000.0	997.0	47.0	997.0	No	-45.23	1001.61
RW-13	444435.24	13320447.67	1010.77	3.00	1007.77	11.0	14.0	3.0	996.8	993.8	14.0	993.8	No		NM
RW-14	446202.95	13320387.44	1031.74	3.25	1028.49	30.0	33.0	3.0	998.5	995.5	33.0	995.5	No	-32.24	999.50
RW-15	445450.12	13320805.75	1051.04	3.29	1047.75	51.0	53.0	2.0	996.8	994.8	53.0	994.8	No	-49.93	1001.11
RW-16	444272.30	13319677.20	1011.43	3.50	1007.93	17.5	20.5	3.0	990.4	987.4	20.5	987.4	No		NM
RW-17	445605.90	13321164.30	1016.76	2.17	1014.59	40.0	43.0	3.0	974.6	971.6	43.0	971.6	No		NM
RW-18	447006.83	13319977.71	1010.78	4.33	1006.45	30.5	33.5	3.0	976.0	973.0	33.5	973.0	No	-4.24	1006.54
SG-1	447491	13321086	973.06	NA	NA	NA	NA	NA	NA	NA	NA	NA	No		NM
SG-2	447158	13321126	972.86	NA	NA	NA	NA	NA	NA	NA	NA	NA	No		NM
SG-3	446686	13321828	972.88	NA	NA	NA	NA	NA	NA	NA	NA	NA	No		NM
SG-4	448241	13322404	967.79	NA	NA	NA	NA	NA	NA	NA	NA	NA	No		NM
SG-5	448342	13323740	967.44	NA	NA	NA	NA	NA	NA	NA	NA	NA	No		NM
SG-6	447554	13321305	973.18	NA	NA	NA	NA	NA	NA	NA	NA	NA	No		NM
SG-7	448923	13320339	975.17	NA	NA	NA	NA	NA	NA	NA	NA	NA	No		NM
SG-8	448508	13321050	973.73	NA	NA	NA	NA	NA	NA	NA	NA	NA	No		NM
SG-9	443006	13320693	989.51	NA	NA	NA	NA	NA	NA	NA	NA	NA	No		NM
SG-10	447173	13320742	972.83	NA	NA	NA	NA	NA	NA	NA	NA	NA	No		NM
PZ-1	444993	13320456	1028.44	NA	NA	14.0	24.0	10.0	NA	NA	NA	NA	No		NM
PZ-2	447600	13321558	982.74	NA	NA	3.5	13.5	10.0	NA	NA	NA	NA	No		NM
PZ-3	447185	13321900	992.35	NA	NA	14.0	24.0	10.0	NA	NA	NA	NA	No		NM
PZ-4	447589	13322238	1010.26	NA	NA	13.0	23.0	10.0	NA	NA	NA	NA	No		NM
PZ-5	446823	13322002	983.73	NA	NA	0.0	10.0	10.0	NA	NA	NA	NA	No		NM
WPZ-1	445800	13319964	993.47	NA	NA	0.0	5.0	5.0	NA	NA	NA	NA	No		NM
WPZ-2	446616	13319932	991.37	NA	NA	0.0	5.0	5.0	NA	NA	NA	NA	No		NM
WPZ-3	446089	13321194	985.87	NA	NA	0.0	5.0	5.0	NA	NA	NA	NA	No		NM
Tipsico La	NA	NA	1012.72	NA	NA	NA	NA	NA	NA	NA	NA	NA	No		NM

NA = Not Available/Applicable  
NM = Not Measured  
\* Hydraulic head calculated by air-line pressure methods.  
† Casing diameter prevents measurement  
@ Insufficient flow into well  
# Well is not screened in the aquifer  
\*\* Pumping equipment prevents water level measurement  
^ Water level not collected due to stuck j-plug  
‡ Water level not collected due to bees in the well casing  
‡ Wasp nest in protective casing  
▪ Well inadvertently not sampled  
~ Frozen air line  
% Well not sampled due to well seal frozen shut

Table 2  
Summary of VOC Analytical Results in Groundwater Samples  
Rose Township Demode Road Site  
Holly, Michigan  
Samples Collected September 18 through 26, 2006  
Earth Tech Project No. 89861.02.04

Volatile Organic Compounds (µg/L)	ROD Target Cleanup Levels <sup>A</sup>		2004 Federal Drinking Water Maximum Contaminant Levels in µg/L	MDEQ Part 201 Generic Cleanup Criteria Concentration in µg/L			Sample Location Concentration in µg/L												
	Phase I Target Concentration Limits in µg/L	Phase II Target Concentration Limits in µg/L		Residential Drinking Water Criteria	Groundwater Surface Water Interface Criteria	Groundwater Contact Criteria	DNR-1	DNR-4D	DNR-6	DNR-7	DNR-7 (dup)	GW-4D	GW-5I	GW-6D	GW-17D	GW-17I	GW-18	GW-19D	GW-19S
Benzene	1.5	0.133	5	5	200	11,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (2.0)	ND (2.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Chlorobenzene	60	60	100	100	47	86,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (2.0)	ND (2.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Chloroethane	---	---	---	430	ID	440,000	ND (1.0)	ND (1.0)	ND (1.0)	10	10	ND (1.0)	3.0	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
1,1-Dichloroethane	---	---	---	880	740	2,400,000	ND (1.0)	ND (1.0)	ND (1.0)	5.7	5.7	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
cis-1,2-Dichloroethene	---	---	70	70	620	200,000	ND (1.0)	ND (1.0)	ND (1.0)	22	23	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
trans-1,2-Dichloroethene	---	---	100	100	1500	220,000	ND (1.0)	ND (1.0)	ND (1.0)	22	23	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Ethylbenzene	680	680	700	74	18	170,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (2.0)	ND (2.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Trichloroethene	1.5	0.627	5	5	200	22,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (2.0)	ND (2.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
1,1,1-Trichloroethane	---	---	200	200	200	1,300,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (2.0)	ND (2.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Vinyl Chloride	1	0.003	2	2	15	1,000	ND (1.0)	ND (1.0)	35	95	95	ND (1.0)	160	ND (1.0)				ND (1.0)	2.6

**Notes:**  
ROD -Record of Decision, EPA September 30, 1987.  
A -Phase I and Phase II TCLs as identified in the Remedial Design and Remedial Action Work Plan (Fred C. Hart Associates, Inc., et al, September 18, 1989).  
MDEQ -Michigan Department of Environmental Quality.  
ID -Inadequate data for MDEQ to develop criterion.  
ND (1.0) -Not detected above the analytical method reporting limits. The analytical method reporting limits are included in parenthesis.  
µg/L -Micrograms per liter.  
--- -No standard available.  
160 -Indicates an exceedance of one or more criteria ( ROD Target Cleanup Levels, MCLs, MDEQ Part 201).

Table 2  
Summary of VOC Analytical Results in Groundwater Samples  
Rose Township Demode Road Site  
Holly, Michigan  
Samples Collected September 18 through 26, 2006  
Earth Tech Project No. 89861.02.04

Volatile Organic Compounds (µg/L)	ROD Target Cleanup Levels <sup>A</sup>		2004 Federal Drinking Water Maximum Contaminant Levels in µg/L	MDEQ Part 201 Generic Cleanup Criteria Concentration in µg/L			GW-19S (dup)	Sample Location Concentration in µg/L											
	Phase I Target Concentration Limits in µg/L	Phase II Target Concentration Limits in µg/L		Residential Drinking Water Criteria	Groundwater Surface Water Interface Criteria	Groundwater Contact Criteria		GW-20D	GW-20I	GW-21D	GW-21S	GW-22D	GW-22I	GW-22S	GW-23D	GW-23I	GW-23I (dup)	GW-23S	GW-24D
Benzene	1.5	0.133	5	5	200	11,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Chlorobenzene	60	60	100	100	47	86,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Chloroethane	—	—	—	430	ID	440,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
1,1-Dichloroethane	—	—	—	880	740	2,400,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
cis-1,2-Dichloroethene	—	—	70	70	620	200,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
trans-1,2-Dichloroethene	—	—	100	100	1500	220,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Ethylbenzene	680	680	700	74	18	170,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Trichloroethene	1.5	0.627	5	5	200	22,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
1,1,1-Trichloroethane	—	—	200	200	200	1,300,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Vinyl Chloride	1	0.003	2	2	15	1,000	2.5	20	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)

**Notes:**  
ROD -Record of Decision, EPA September 30, 1987.  
A -Phase I and Phase II TCLs as identified in the Remedial Design and Remedial Action Work Plan (Fred C. Hart Associates, Inc., et al, Sept  
MDEQ -Michigan Department of Environmental Quality.  
ID -Inadequate data for MDEQ to develop criterion.  
ND (1.0) -Not detected above the analytical method reporting limits. The analytical method reporting limits are included in parenthesis.  
µg/L -Micrograms per liter.  
— -No standard available.  
160 -Indicates an exceedance of one or more criteria ( ROD Target Cleanup Levels, MCLs, MDEQ Part 201).

Table 2  
Summary of VOC Analytical Results in Groundwater Samples  
Rose Township Demode Road Site  
Holly, Michigan  
Samples Collected September 18 through 26, 2006  
Earth Tech Project No. 89861.02.04

Volatile Organic Compounds (µg/L)	ROD Target Cleanup Levels <sup>A</sup>		2004 Federal Drinking Water Maximum Contaminant Levels in µg/L	MDEQ Part 201 Generic Cleanup Criteria Concentration in µg/L				Sample Location Concentration in µg/L											
	Phase I Target Concentration Limits in µg/L	Phase II Target Concentration Limits in µg/L		Residential Drinking Water Criteria	Groundwater Surface Water Interface Criteria	Groundwater Contact Criteria		GW-24I	GW-25D	GW-25I	GW-26D	GW-26I	GW-26I (dup)	MW-102D	MW103S	MW-3I	PW-7	PW-8	RW-1D
Benzene	1.5	0.133	5	5	200	11,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	7.6	ND (1.0)	ND (1.0)	ND (1.0)
Chlorobenzene	60	60	100	100	47	86,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	2.1	28
Chloroethane	---	---	---	430	ID	440,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	3.3	1.3	ND (1.0)	ND (1.0)
1,1-Dichloroethane	---	---	---	880	740	2,400,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	6.3	ND (1.0)	ND (1.0)	ND (1.0)
cis-1,2-Dichloroethene	---	---	70	70	620	200,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	3.9	ND (1.0)	74	2.1	18	ND (1.0)
trans-1,2-Dichloroethene	---	---	100	100	1500	220,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	1.4	ND (1.0)	34	2.4	31	ND (1.0)
Ethylbenzene	680	680	700	74	18	170,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	5.0
Trichloroethene	1.5	0.627	5	5	200	22,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	52	62	ND (1.0)
1,1,1-Trichloroethane	---	---	200	200	200	1,300,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	9.5	ND (1.0)	ND (1.0)	ND (1.0)
Vinyl Chloride	1	0.003	2	2	15	1,000	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	---	---	ND (1.0)	1.1

**Notes:**  
ROD -Record of Decision, EPA September 30, 1987.  
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MDEQ -Michigan Department of Environmental Quality.  
ID -Inadequate data for MDEQ to develop criterion.  
ND (1.0) -Not detected above the analytical method reporting limits. The analytical method reporting limits are included in parenthesis.  
µg/L -Micrograms per liter.  
--- -No standard available.  
-Indicates an exceedance of one or more criteria ( ROD Target Cleanup Levels, MCLs, MDEQ Part 201).

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**Notes:**  
All units are in micrograms per liter (ug/L).  
"–" indicates that the compound was not analyzed.  
"ND" indicates not detected above the laboratory reporting limit (detection limit not available).  
"<" indicates less than the laboratory reporting limit shown.  
"(dup)" indicates that the sample is a duplicate collected for quality assurance purposes.  
"(dup 1)" indicates that a duplicate sample was collected using a bladder pump (for comparison) instead of a peristaltic pump (original sample collected with peristaltic pump).  
Analytes were analyzed via USEPA Method 8260 for volatile organic compounds.

TCE - Trichloroethene  
Cis-1,2-DCE = Cis-1,2-Dichloroethene

**Table 4**  
**Summary of Biogeochemical and Field Parameters in Groundwater Samples**  
**Rose Township Demoda Road Site**  
**Holly, Michigan**  
**Samples Collected September 18 through 26, 2006**  
**Earth Tech Project No. 89861.02.04**

Biogeochemical and Field Parameters	Units	Sample Locations														
		DNR-1	DNR-4D	DNR-6	DNR-7	DNR-7 (dup)	GW-4D	GW-5I	GW-6D	GW-17I	GW-17D	GW-18	GW-19S	GW-19S (dup)	GW-19D	GW-20I
Field Parameters																
pH	S.U.	7.42	7.73	7.85	7.99	NA	7.29	7.85	7.27	7.43	7.47	7.74	7.27	NA	7.24	7.24
Conductivity	µS/cm	551	553	378	416	NA	599	440	584	432	422	440	806	NA	632	635
Dissolved Oxygen	mg/L	0.13	0.17	0.98	0.31	NA	0.20	0.22	0.13	0.26	0.21	0.66	0.13	NA	0.15	0.12
Temperature	°C	9.92	13.22	13.30	11.56	NA	10.50	10.97	9.78	10.30	10.41	10.99	10.33	NA	10.65	8.94
Oxidation/Reduction Potential	mv	38	45	165	-80	NA	66	-87	57	-70	-87	-61	63	NA	71	76
Salinity	PSS	0.26	0.26	0.16	NS	NA	0.29	NS	0.26	NS	NS	NS	0.29	NA	0.30	0.30
Turbidity	NTU	4.5	19.0	3.5	43.3	NA	19.0	5.2	1.9	0.2	0.0	1.2	1.0	NA	5.3	1.0
Sulfide	mg/L	0.04	0.46	0.75	0.66	NA	0.16	0.10	0.00	0.01	0.02	0.00	0.20	NA	0.01	0.01
Dissolved Iron	mg/L	2.50	0.56	0.77	1.61	NA	1.92	1.43	2.08	1.75	2.13	1.97	1.60	NA	1.94	1.68
Dissolved Manganese	mg/L	1.1	0.5	0.9	0.6	NA	0.50	0.3	0.7	0.6	0.2	0.4	0.0	NA	2.4	0.5
Biogeochemical Parameters																
Nitrogen, Ammonia	mg/L	0.24	0.1	ND (0.05)	0.072	0.073	0.13	0.097	0.055	0.1	0.093	0.11	0.088	0.095	0.16	0.18
Total Organic Carbon	mg/L	1.5	1.2	14	1.4	1.4	1.2	1.3	1.1	1.2	1.2	1.1	1.2	1.3	1.3	1.8
Nitrogen, Nitrate	mg/L	ND (0.050)	ND (0.050)	ND (0.05)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)
Nitrogen, Nitrite	mg/L	ND (0.050)	ND (0.050)	ND (0.05)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)
Sulfate	mg/L	ND (5.0)	7.9	22	ND (5.0)	28	22	18	22	14	11	16	26	26	31	16
Chloride	mg/L	1.3	5.5	8.9	4.1	67	3	4.3	2.6	3.9	2.7	3.6	3.8	4	5.6	4.9
Total Alkalinity	mg/L	290	280	160	310	300	310	310	290	310	300	300	290	340	300	320
Dissolved Gases																
Ethane Gas in Water	µg/L	ND (2.0)	ND (1.0)	ND (1.0)	ND (4.0)	ND (4.0)	ND (1.0)	ND (2.0)	ND (1.0)	ND (2.0)	ND (2.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Ethene Gas in Water	µg/L	ND (2.0)	ND (1.0)	ND (1.0)	4.6	4.1	ND (1.0)	2.2	ND (1.0)	ND (2.0)	ND (2.0)	1.2	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Methane Gas in Water	µg/L	53	4.2	46	98	93	12	60	6.1	67	46	15	4.0	4.3	1.2	6.9

**Notes:**

ND (5.0) -Not detected above analytical method  
reporting limits are listed in parenthesis.

S.U. -Standard Units  
NTU -Nephelometric Turbidity Units  
µS/cm -MicroSiemens per Centimeter  
mg/L -Milligram per Liter  
µg/L -Microgram per Liter  
°C -Degrees Celsius  
mv -Millivolt  
PSS -Practical Salinity Scale  
NA -Not available  
NS -Sample location not sampled

**Table 4**  
**Summary of Biogeochemical and Field Parameters in Groundwater Samples**  
**Rose Township Demode Road Site**  
**Holly, Michigan**  
**Samples Collected September 18 through 26, 2006**  
**Earth Tech Project No. 89861.02.04**

Biogeochemical and Field Parameters	Units	Sample Locations														
		GW-20D	GW-21S	GW-21D	GW-22S	GW-22I	GW-22D	GW-23S	GW-23I	GW-23I (dup)	GW-23D	GW-24I	GW-24D	GW-25I	GW-25D	GW-26I
Field Parameters																
pH	S.U.	7.30	7.30	7.23	7.79	7.20	7.60	7.38	7.73	NA	7.56	7.48	7.44	7.22	7.53	7.30
Conductivity	µS/cm	599	552	642	455	612	416	614	577	NA	599	583	629	591	629	598
Dissolved Oxygen	mg/L	0.08	0.11	0.13	0.29	0.27	1.29	1.01	0.20	NA	2.50	0.50	0.14	0.18	0.24	2.20
Temperature	C°	9.92	9.96	9.95	10.96	11.65	12.69	11.22	11.40	NA	11.16	11.96	12.59	12.06	11.62	10.71
Oxidation/Reduction Potential	mv	82	60	79	33	89	288	100	-74	NA	180	159	49	82	-9	86
Salinity	PSS	0.29	0.28	0.31	0.22	0.29	0.22	0.29	0.28	NA	0.29	0.28	0.30	0.28	0.30	0.29
Turbidity	NTU	1.0	10.3	2.6	1.6	1.2	4.5	1.2	1.2	NA	1.4	1.5	2.2	1.3	1.6	1.2
Sulfide	mg/L	0.01	0.06	0.00	0.05	0.03	0.04	0.03	0.80	NA	0.80	0.06	0.19	0.01	0.66	0.27
Dissolved Iron	mg/L	1.98	1.38	0.49	0.56	2.14	0.25	1.75	0.01	NA	0.04	1.00	0.87	1.81	0.38	0.63
Dissolved Manganese	mg/L	0.2	1.0	3.6	0.3	1.5	0.4	0.5	0.6	NA	0.1	0.5	0.3	0.4	0.4	0.5
Biogeochemical Parameters																
Nitrogen, Ammonia	mg/L	0.14	0.15	0.22	0.15	0.14	ND (0.050)	0.12	0.05	0.08	0.11	0.096	0.073	0.12	ND (0.050)	ND (0.050)
Total Organic Carbon	mg/L	1.2	1.6	1.5	1.2	1.3	1.6	1.2	1.30	1.30	1.3	1.3	1.4	1.5	1.4	2
Nitrogen, Nitrate	mg/L	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	0.16	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)
Nitrogen, Nitrite	mg/L	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)
Sulfate	mg/L	12	18	ND (5.0)	23	18	21	26	10.00	15.00	5.5	8.1	19	9.4	14	16
Chloride	mg/L	2.7	5.7	2	2.3	2.7	8.3	3.6	8.60	8.60	5.1	2.6	7.1	2.1	4.4	2.5
Total Alkalinity	mg/L	300	320	290	220	310	210	300	300.00	310.00	310	290	300	310	310	310
Dissolved Gases																
Ethane Gas in Water	µg/L	ND (2.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (2.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Ethene Gas in Water	µg/L	ND (2.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (2.0)	2.5	2.1	ND (1.0)	1.7	ND (1.0)
Methane Gas in Water	µg/L	67	6.7	36	18	1.6	ND (0.50)	2.6	5.5	5.2	59	6.7	3.1	2.6	2.9	1.8

**Notes:**  
ND (5.0) -Not detected above analytical method reporting limits are listed in parenthesis.

S.U. -Standard Units  
NTU -Nephelometric Turbidity Units  
µS/cm -MicroSiemens per Centimeter  
mg/L -Milligram per Liter  
µg/L -Microgram per Liter  
C° -Degrees Celsius  
mv -Millivolt  
PSS -Practical Salinity Scale  
NA -Not available  
NS -Sample location not sampled.

**Table 4**  
**Summary of Biogeochemical and Field Parameters in Groundwater Samples**  
**Rose Township Demode Road Site**  
**Holly, Michigan**  
**Samples Collected September 18 through 26, 2006**  
**Earth Tech Project No. 89861.02.04**

Biogeochemical and Field Parameters		Units	Sample Locations							
			GW-28I (dup)	GW-28D	MW-3I	MW-102D	MW-103S	PW7	PW8	RW-1D
Field Parameters										
pH	S.U.	NA	9.70	8.03	7.54	7.89	7.13	7.24	7.48	7.95
Conductivity	µS/cm	NA	288	431	437	459	687	680	523	477
Dissolved Oxygen	mg/L	NA	0.26	0.65	0.23	0.86	0.57	0.52	0.32	0.84
Temperature	C°	NA	10.67	10.39	12.25	11.63	11.77	10.47	10.91	11.42
Oxidation/Reduction Potential	mv	NA	-10	-80	141	-81	108	83	165	-104
Salinity	PSS	NA	0.14	NS	NS	NS	0.33	0.28	0.25	NS
Turbidity	NTU	NA	1.4	27.7	2.3	47.3	7.2	2.3	1.28	12.1
Sulfide	mg/L	NA	0.03	0.15	0.08	0.05	0.00	0.03	NS	0.17
Dissolved Iron	mg/L	NA	0.07	2.20	0.20	1.81	2.16	1.51	NS	8.23
Dissolved Manganese	mg/L	NA	0.6	0.3	0.1	1.1	1.0	1.1	NS	1.4
Biogeochemical Parameters										
Nitrogen, Ammonia	mg/L	ND (0.050)	ND (0.050)	0.11	0.082	0.16	0.14	0.16	0.1	ND (0.050)
Total Organic Carbon	mg/L	2.2	22	1.6	1	1.4	1.4	1.1	1.7	ND (1.0)
Nitrogen, Nitrate	mg/L	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	0.17	ND (0.050)	ND (0.050)
Nitrogen, Nitrite	mg/L	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)	ND (0.050)
Sulfate	mg/L	9.8	15	14	ND (5.0)	15	8.8	18	ND (5.0)	21
Chloride	mg/L	2.3	13	5.2	1.9	4.7	4	7.8	2.8	5.6
Total Alkalinity	mg/L	320	100	310	240	320	300	340	300	310
Dissolved Gases										
Ethane Gas in Water	µg/L	ND (1.0)	8.2	ND (1.0)	ND (20)	ND (1.0)	ND (4.0)	ND (1.0)	ND (4.0)	ND (1.0)
Ethane Gas in Water	µg/L	ND (1.0)	1.6	ND (1.0)	ND (20)	ND (1.0)	8.7	ND (1.0)	ND (4.0)	ND (1.0)
Methane Gas in Water	µg/L	2.2	16	9.8	560	9.4	94	5.3	130	ND (0.50)

**Notes:**

ND (5.0) -Not detected above analytical method reporting limits are listed in parenthesis

S.U. -Standard Units  
 NTU -Nephelometric Turbidity Units  
 µS/cm -MicroSiemens per Centimeter  
 mg/L -Milligram per Liter  
 µg/L -Microgram per Liter  
 C° -Degrees Celsius  
 mv -Millivolt  
 PSS -Practical Salinity Scale  
 NA -Not available  
 NS -Sample location not sampled

**Table 5**  
**Summary of Analytical Data**  
**Influent Effluent Conc.**  
**Groundwater Extraction and Treatment System**  
**Rose Township Site**  
*Units as Given*

Sampling Month: Sample Date:		Discharge Limitations	September Data 09/06/06 09/06/06		September Data 09/18/06 09/18/06		September Data 09/25/06 09/25/06		September Monthly Average Effluent
Site Identification:		See footnote after table 1	Influent	Effluent	Influent	Effluent	Influent	Effluent	
<b>Compound Name</b>	<b>Units</b>								
Chlorobenzene	ug/L	5(m)	-	-	-	-	-	-	<1
Methylene chloride	ug/L	5(m)	-	-	-	-	-	-	<1
1,1,1-Trichloroethane	ug/L	5(m)	-	-	-	-	-	-	<1
Trichloroethylene	ug/L	5(m)	-	-	-	-	-	-	<1
Vinyl chloride	ug/L	3(m)	24	<1	28	<1	23	<1	<1
Benzene	ug/L	5(m)	-	-	-	-	-	-	<1
Toluene	ug/L	5(m)	-	-	-	-	-	-	<1
1,2-Dichloroethylene	ug/L	NA	9.6	<2	10	<2	11	<2	<2
PCB: aroclor 1016	ug/L	*	-	-	-	-	-	-	<1
PCB: aroclor 1221	ug/L	*	-	-	-	-	-	-	<1
PCB: aroclor 1232	ug/L	*	-	-	-	-	-	-	<1
PCB: aroclor 1242	ug/L	*	-	-	-	-	-	-	<1
PCB: aroclor 1248	ug/L	*	-	-	-	-	-	-	<1
PCB: aroclor 1254	ug/L	*	-	-	-	-	-	-	<1
PCB: aroclor 1260	ug/L	*	-	-	-	-	-	-	<1
Arsenic, total	ug/L	50(a)	-	7.6	-	6.9	-	16	10.2
Bis(2-ethyl hexyl)phthalate	ug/L	5(m)	-	<5	-	<5	-	<5	<5
Iscophorone	ug/L	5(m)	-	-	-	-	-	-	<5
Lead, total	ug/L	14(a)	-	<1	-	<1	-	<1	<1
Naphthalene	ug/L	5(m)	-	-	-	-	-	-	<5
Pentachlorophenol	ug/L	0.8(a)	-	-	-	-	-	-	<0.5
Air Emission Rate	lbs/hr	1.0 †	0.0032		0.0024		0.0035		
Cumulative Mass Removal	lbs		432.64		433.64		434.05		

- = Not Analyzed

\* = Discharge limitation is 0.00002 ug/L for  
total PCB's.

† = The air emission discharge limitation of 3.0  
pounds per hour includes the emissions  
from the soil vapor extraction system.

(a) = Monthly Average

(m) = Daily Average

4.6 = Analyte above method detection limits (MDL)

SD = Serial dilution was not required for this sample  
because the analyte was 100 times the MDL.

**Table 5**  
**Summary of Analytical Data**  
**Influent Effluent Conc.**  
**Groundwater Extraction and Treatment System**  
**Rose Township Site**  
*Units as Given*

Sampling Month: Sample Date:		Discharge Limitations	July Data 07/03/06 07/03/06		July Data 07/10/06 07/10/06		July Data 07/17/06 07/17/06		July Data 07/24/06 07/24/06		July Data 07/31/06 07/31/06		July Monthly Average Effluent
Site Identification:		See footnote after table 1	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	
<b>Compound Name</b>	<b>Units</b>												
Chlorobenzene	ug/L	5(m)	-	-	-	-	-	-	-	<1	-	-	-
Methylene chloride	ug/L	5(m)	-	-	-	-	-	-	-	<1	-	-	-
1,1,1-Trichloroethane	ug/L	5(m)	-	-	-	-	-	-	-	<1	-	-	-
Trichloroethylene	ug/L	5(m)	-	-	-	-	-	-	-	<1	-	-	-
Vinyl chloride	ug/L	3(m)	<b>31</b>	<1	<b>24</b>	<1	<b>17</b>	<1	<b>27</b>	<1	<b>24</b>	<1	<1
Benzene	ug/L	5(m)	-	-	-	-	-	-	<1	<1	-	-	-
Toluene	ug/L	5(m)	-	-	-	-	-	-	<1	<1	-	-	-
1,2-Dichloroethylene	ug/L	NA	<b>11</b>	<2	<b>12</b>	<2	<b>9.6</b>	<2	<b>11</b>	<1	<b>11</b>	<2	<2
PCB: aroclor 1016	ug/L	*	-	-	-	-	-	-	<1	<1	-	-	-
PCB: aroclor 1221	ug/L	*	-	-	-	-	-	-	<1	<1	-	-	-
PCB: aroclor 1232	ug/L	*	-	-	-	-	-	-	<1	<1	-	-	-
PCB: aroclor 1242	ug/L	*	-	-	-	-	-	-	<1	<1	-	-	-
PCB: aroclor 1248	ug/L	*	-	-	-	-	-	-	<1	<1	-	-	-
PCB: aroclor 1254	ug/L	*	-	-	-	-	-	-	<1	<1	-	-	-
PCB: aroclor 1260	ug/L	*	-	-	-	-	-	-	<1	<1	-	-	-
Arsenic, total	ug/L	50(a)	-	<b>8.3</b>	-	<b>6.8</b>	-	<b>5.9</b>	-	<b>9.9</b>	-	<b>11</b>	<b>8.4</b>
Bis(2-ethyl hexyl)phthalate	ug/L	5(m)	-	<5	-	<5	-	<5	-	<5	-	<0.5	<5
Isophorone	ug/L	5(m)	-	-	-	-	-	-	-	<5	-	-	-
Lead, total	ug/L	14(a)	-	<1	-	<1	-	<1	-	<1	-	<1	<1
Naphthalene	ug/L	5(m)	-	-	-	-	-	-	-	<5	-	-	-
Pentachlorophenol	ug/L	0.8(a)	-	-	-	-	-	-	-	<0.5	-	-	<0.5
Air Emission Rate	lbs/hr	1.0 †	0.0045		0.0033		0.0022		0.0036		0.0032		
Cumulative Mass Removal	lbs		426.86		427.62		428.17		428.54		429.14		

- = Not Analyzed

\* = Discharge limitation is 0.00002 ug/L for  
total PCB's.

† = The air emission discharge limitation of 3.0  
pounds per hour includes the emissions  
from the soil vapor extraction system.

(a) = Monthly Average

(m) = Daily Average

**4.6** = Analyte above method detection limits (MDL)

SD = Serial dilution was not required for this sample  
because the analyte was 100 times the MDL



**Table 5**  
**Summary of Analytical Data**  
**Influent Effluent Conc.**  
**Groundwater Extraction and Treatment System**  
**Rose Township Site**  
*Units as Given*

Sampling Month: Sample Date:		Discharge Limitations	August Data 08/07/06 08/07/06		August Data 08/14/06 08/14/06		August Data 08/22/06 08/22/06		August Data 08/28/06 08/28/06		August Monthly Average Effluent
Site Identification:		See footnote after table 1	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	
<b>Compound Name</b>	<b>Units</b>										
Chlorobenzene	ug/L	5(m)	-	-	-	-	-	-	-	-	<1
Methylene chloride	ug/L	5(m)	-	-	-	-	-	-	-	-	<1
1,1,1-Trichloroethane	ug/L	5(m)	-	-	-	-	-	-	-	-	<1
Trichloroethylene	ug/L	5(m)	-	-	-	-	-	-	-	-	<1
Vinyl chloride	ug/L	3(m)	24	<1	41	<1	25	<1	28	<1	<1
Benzene	ug/L	5(m)	-	-	-	-	-	-	-	-	<1
Toluene	ug/L	5(m)	-	-	-	-	-	-	-	-	<1
1,2-Dichloroethylene	ug/L	NA	12	<1	12	<2	12	<2	14	<2	<2
PCB: aroclor 1016	ug/L	*	-	-	-	-	-	-	-	-	<1
PCB: aroclor 1221	ug/L	*	-	-	-	-	-	-	-	-	<1
PCB: aroclor 1232	ug/L	*	-	-	-	-	-	-	-	-	<1
PCB: aroclor 1242	ug/L	*	-	-	-	-	-	-	-	-	<1
PCB: aroclor 1248	ug/L	*	-	-	-	-	-	-	-	-	<1
PCB: aroclor 1254	ug/L	*	-	-	-	-	-	-	-	-	<1
PCB: aroclor 1260	ug/L	*	-	-	-	-	-	-	-	-	<1
Arsenic, total	ug/L	50(a)	-	6.6	-	12	-	6.7	-	7.3	8.2
Bis(2-ethyl hexyl)phthalate	ug/L	5(m)	-	<5	-	<5	-	<5	-	<5	<5
Isophorone	ug/L	5(m)	-	-	-	-	-	-	-	-	<5
Lead, total	ug/L	14(a)	-	<1	-	<1	-	<1	-	<1	<1
Naphthalene	ug/L	5(m)	-	-	-	-	-	-	-	-	<5
Pentachlorophenol	ug/L	0.8(a)	-	-	-	-	-	-	-	-	<0.5
Air Emission Rate	lbs/hr	1.0 †	0.0032		0.0055		0.0033		0.0042		
Cumulative Mass Removal	lbs		429.67		430.21		431.26		431.74		

- = Not Analyzed

\* = Discharge limitation is 0.00002 ug/L for  
total PCB's.

† = The air emission discharge limitation of 3.0  
pounds per hour includes the emissions  
from the soil vapor extraction system.

(a) = Monthly Average

(m) = Daily Average

4.6 = Analyte above method detection limits (MDL)

SD = Serial dilution was not required for this sample  
because the analyte was 100 times the MDL

**Table 6**  
**Summary of Operational Flow Data**  
**Groundwater Extraction and Treatment System**  
**Rose Township Site**  
**September 2006**

Well ID	Jul-06			Aug-06			Sep-06		
	Monthly Total (Gallons)	Flowrate (gpm)	% Operation	Monthly Total (Gallons)	Flowrate (gpm)	% Operation	Monthly Total (Gallons)	Flowrate (gpm)	% Operation
PW-1	2550214	57	100	2562286	57	100	1868143	43	87
PW-3	3141643	70	100	3153968	71	100	2790889	65	87
PW-4	49454	1	29	634111	14	32	1813460	42	87
PW-6	3140903	70	100	3137206	70	100	2113175	49	87
PW-7	1471405	33	100	1351762	30	100	985238	23	87
PW-8	1081952	24	100	1070603	24	100	952825	22	87